SONY®

MXP-2000 Series

PROFESSIONAL MIXING CONSOLE

OPERATION AND MAINTENANCE MANUAL

Volume 1, 1st Edition

T-9482-342-1

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ADDENDUM SHEET

MXP-2000 SERIES CONSOLES OPERATION AND MAINTENANCE MANUAL
MONITOR MODULE MXBK-2006

Some versions of Monitor Module MXBK-2006 have jumpers JW16 and JW17 installed, these being used to improve the impedance match for external headphones.

In cases where low impedance headphones (typically 100 ohms or less) are to be used in the HEADPHONES jack, jumpers JW16 and JW17 should be removed. For higher impedance headphones, JW16 and JW17 should be left in place.

It should be noted that the need to remove JW16 and JW17 is usually indicated by excessive distortion in the headphones' audio.

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WARNING

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instuction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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SECTION 1
INTRODUCTION

1.1 OVERVIEW

The **MXP-2000** series of audio mixing consoles has been conceived to meet the needs of the professional audio industry. These consoles have applications in radio, recording, film, and television production/post-production work. For television applications, the **MXP-2000** is one of the very few consoles to offer an optional, integral parallel Video Editor Interface.

The **MXP-2000** (see Figure 1-1) represents a new dimension in flexibility and ease of operation. It incorporates the latest techniques and circuits, ensuring complete state-of-the-art performance. All console specifications meet or exceed most of the current world-wide performance standards.

The console is assembled in a frame of simple construction which combines strength and rigidity with low mass. It incorporates only one ribbon-flex harness, all other connections being made by means of printed circuits. This arrangement enhances reliability and repeatability of performance. An additional benefit is that it allows any module to be inserted into any slot, facilitating ease of configuration and off-the-shelf customization.

All of the audio switches in the console have precious metal contacts, and all connector contacts are similarly plated. Potentiometers and Faders are conductive plastic types. These factors further enhance console reliability and longevity.

The audio circuit design of the console incorporates many novel features and innovations, and both plug-in subassemblies and specially designed hybrid devices have been used so as to achieve the necessary packaging density. These modules improve reliability and allow greater ease of service. In addition, jumper

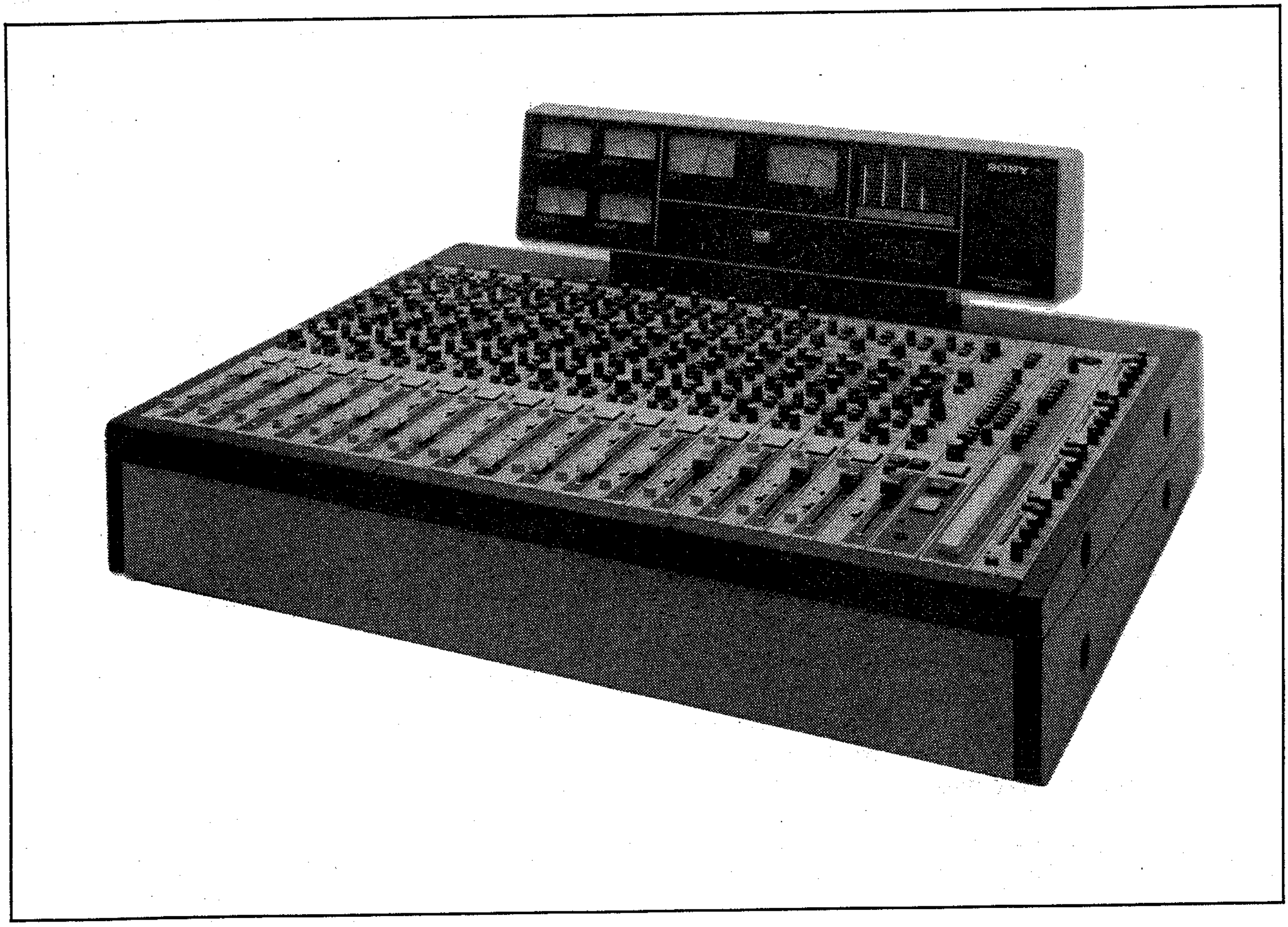


Figure 1-1. MXP-2000 Series Console

blocks within the modules provide the user with a wide choice of logic and signal flow arrangements.

Power for the console is provided by a convection-cooled, free-standing power supply. The supply contains no switching circuits, and this ensures very low mechanical and electrical noise levels. Further, the conservative rating of the supply is such as to ensure low operating temperatures.

1.2 CONSOLE FEATURES

The major features of the console include:

- Choice of transformer balanced or electronically balanced input cards
- Microphone or line inputs
- Separate input gain controls
- Built-in phantom power for microphones
- Switchable attenuators (20 dB) for microphone inputs
- Three-band Equalizers with sweepable mid frequency
- Three auxiliary Sends, two mono and one stereo
- Audio or VCA grouping
- Optional four-channel dynamics controller
- Peak audio level indicators
- Cough switch input follows input selection
- Built-in reverse talkback facility
- In-place SOLO operation
- Optional Automatic (Fader down) PFL
- Built-in, programmable Clock/Timer
- Secondary voltage regulation on each card

1.3 SYSTEM CONFIGURATIONS

The **MXP-2000** series console is available as a basic console (paragraph 1.3.1) or in a standardized console system configuration (paragraph 1.3.2). The basic console is supplied with only Master, Monitor and Communications modules, allowing the user to install such other modules as he may require, while the console system is supplied as a complete unit whose factory-designed configuration is based on known requirements which have been established through many years of practical experience.

Characteristics common to both the basic console and the console system are:

- Two separate program feeds
- Programmable REHEARSE/ON AIR logic
- Programmable Clock
- Four stereo monitor inputs
- Five external talkback outputs
- Built-in tone oscillator
- Optional Video Editor Interface **MXBK-EI21** available

1.3.1 Basic Consoles

The two basic console frames are designated **MXP-2016** and the **MXP-2016P**. Both of these frames have 20-module capability, and differ only in their output metering arrangements, the **MXP-2016** having Volume Unit (VU) meters, and the **MXP-2016P** having Peak Program (PPM) meters. The peak program meters meet BBC specifications and conform to BS 4297.

In the basic consoles, three of the slots are used for those modules which are mandatory to the system, these being Master module **MXBK-2005**, Monitor module **MXBK-2006**, and Communications module **MXBK-2007**. The remaining slots may be fitted with such combinations of Input/Output, Group, or Dynamics modules as meet the user's requirements. The various modules are illustrated in Figure 1-2.

1.3.2 Console Systems

The standardized console systems are designated **MXP-2016S1** and **MXP-2016PS1**. As with the **MXP-2016** and **MXP-2016P**, the consoles differ only in their metering arrangements, the **MXP-2016S1** having VU meters, and the **MXP-2016PS1** having PPM meters. Both console systems are so arranged that any module can be fitted into any slot, thus allowing the user to insert the system modules into those locations that best suit his working methods.

The basic configuration for either console system includes:

- 12 each Input/Output Modules, **MXBK-2001**
- 4 each Group Modules, **MXBK-2002**
- 1 each Master Module, **MXBK-2005**
- 1 each Monitor Module, **MXBK-2006**
- 1 each Communications Module, **MXBK-2007**
- 1 each Dynamics Module, **MXBK-2003**

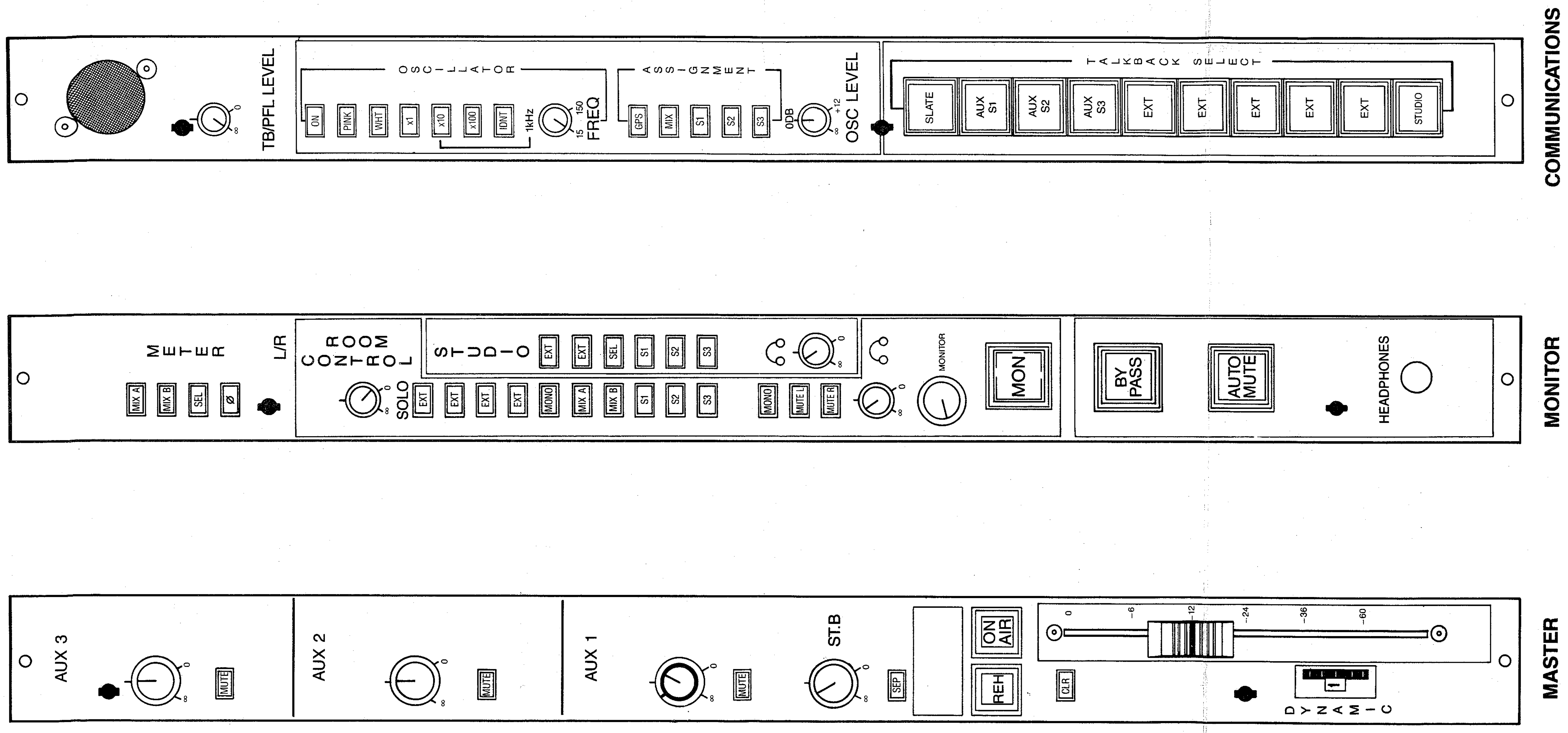

TB/PFL LEVEL
OSCILLATOR
ON
PINK
WHT
x1
x10
x100
IDNT
1kHz
15
150
FREQ
ASSIGNMENT
GPS
MIX
S1
S2
S3
0DB
+12
OSC LEVEL
TALKBACK SELECT
SLATE
AUX S1
AUX S2
AUX S3
EXT
EXT
EXT
EXT
EXT
STUDIO
COMMUNICATIONS
METER
MIX A
MIX B
SEL
Ø
L/R
CONTROL ROOM
SOLO
STUDIO
EXT
EXT
SEL
S1
S2
S3
EXT
EXT
EXT
EXT
MONO
MIX A
MIX B
S1
S2
S3
MONO
MUTE L
MUTE R
MONITOR
MON
BY PASS
AUTO MUTE
HEADPHONES
MONITOR
AUX 3
MUTE
AUX 2
MUTE
AUX 1
MUTE
ST.B
SEP
ON AIR
REH
CLR
0
-6
-12
-24
-36
-60
DYNAMIC
MASTER

Figure 1-2. MXP-2000 Modules (Sheet 1 of 2)

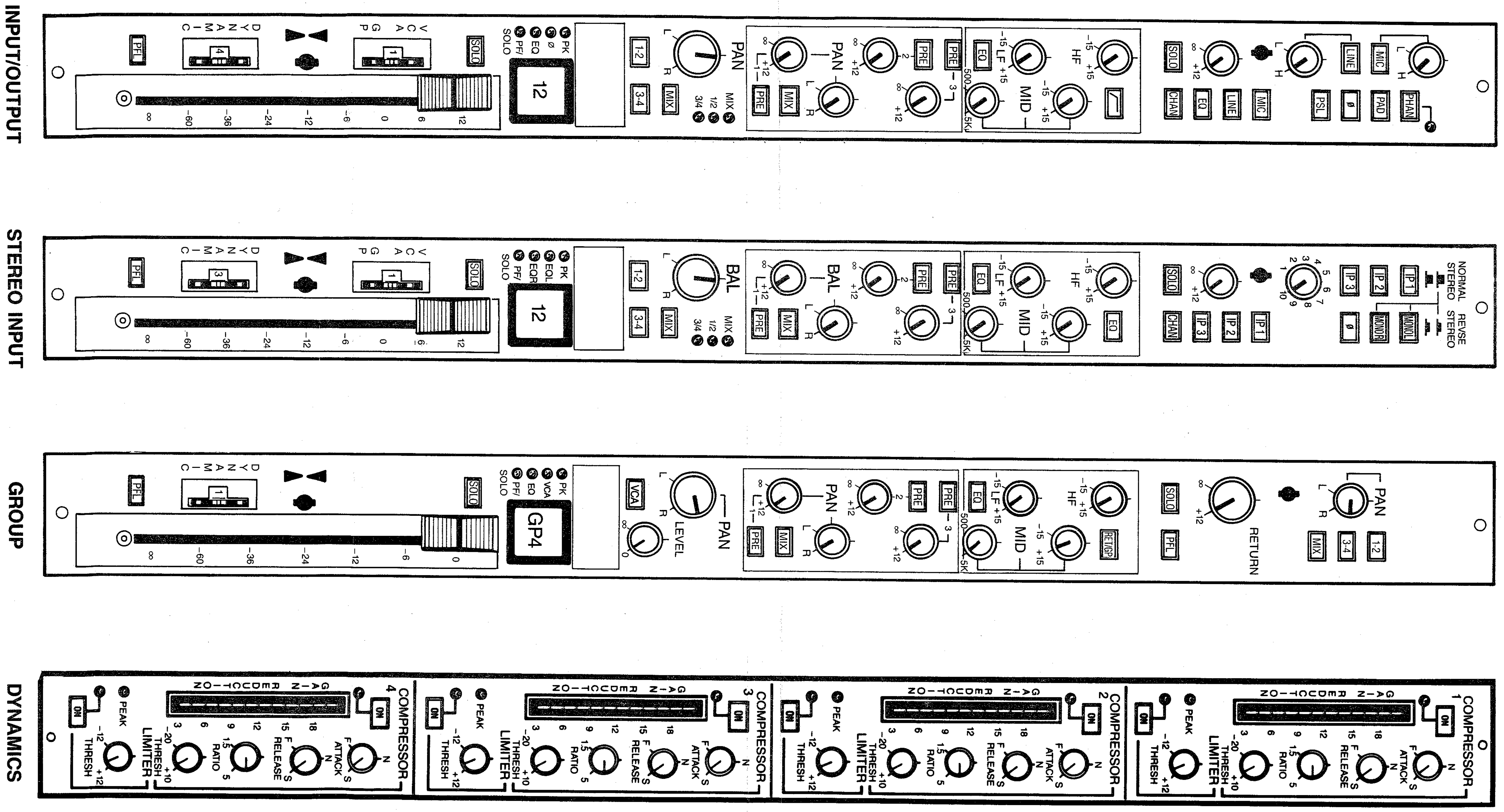

INPUT/OUTPUT
STEREO INPUT
GROUP
DYNAMICS
PFL
SOLO
DYNAMIC
VCA GP
PK
EQ
PF/ SOLO
MIX 1/2 3/4
1-2
3-4
MIX
PAN
BAL
PRE
HF
MID
LF
EQ
CHAN
LINE
MIC
PSL
PAD
PHAN
IP 1
IP 2
IP 3
MONO L
MONO R
NORMAL STEREO
REVSE STEREO
VCA
LEVEL
RETURN
RET/GP
GP4
COMPRESSOR 1
COMPRESSOR 2
COMPRESSOR 3
COMPRESSOR 4
GAIN REDUCTION
ON
PEAK
THRESH
RATIO
RELEASE
ATTACK
LIMITER

Figure 1-2. MXP-2000 Modules (Sheet 2 of 2)

1.3.3 Mandatory Modules

Those modules which are mandatory to console operation are the Master, Monitor, and Communications modules. Each of these is discussed briefly in paragraphs 1.3.3.1 through 1.3.3.3.

1.3.3.1 Master Module MXBK-2005

This module provides all of the master controls for the console's stereo output, and at least one Master module must be incorporated in the system. No optional plug-in cards are available for this module.

Master module features include:

- Separation switch which allows independent level control of a second stereo output
- Auxiliary mix (Send) bus master level controls
- REHearse/ON AIR logic switching
- Assignable to dynamics processor (in Dynamics module **MXBK-2003**)
- Functional control of Editor Interface Card

1.3.3.2 Monitor Module MXBK-2006

The Monitor module controls the routing of Monitor and Meter signal outputs from the console. In addition to the external outputs, the module provides separate switching and level controls for the control room and studio monitors. Level controls also are provided for the Mono signal, Mix A, Mix B, Sends, and the SOLO bus. No optional plug-in cards are available for this module.

1.3.3.3 Communications Module MXBK-2007

The Communications module provides talkback facilities between the console operator and the studio or such other destinations as may be desired by the user. The module also incorporates a Slate oscillator for generating Take markers, as well as pink and white noise generators and a second test oscillator, these being used for test and calibration purposes. The major Communications module features include:

- Reference tone adjustable from 15 Hz. to 15 kHz.
- Tone level and frequency controls detented at 0 dB and 1 kHz.
- Selectable white or pink noise sources
- Easily identifiable warble tone
- Talkback/PFL level control
- Oscillator routing switches
- User-configurable talkback switches

1.3.4 Input/Output Modules

Two Input/Output (I/O) module versions are available for the console, these being the monophonic I/O and Stereo Input modules. The console can be fitted with all Stereo modules, all monophonic modules, or any combination of both types that the user may require. Each of these modules has optional configurations, and these are discussed briefly in paragraphs 1.3.4.1 and 1.3.4.2.

1.3.4.1 Monophonic I/O Module MXBK-2001

The standard monophonic I/O module accomodates two input cards, and these may be either transformer balanced or electronically balanced. These plug-in cards can be fitted so as to configure the module for two microphone inputs, two line inputs, or one line input and one microphone input. The various plug-in card types are listed below. It should be noted that the **MXBK-2001** modules supplied with the standardized console system incorporate one **MXBK-MI21** and one **MXBK-LI21**.

- **MXBK-LI21** — Transformer balanced line input card
- **MXBK-LI22** — Electronically balanced line input card
- **MXBK-MI21** — Transformer balanced microphone input card
- **MXBK-MI22** — Electronically balanced microphone input card

The major features of the monophonic I/O module are:

- Direct output
- One stereo and two mono sends with pre-fader/post-fader selector
- Assignable to any one of four audio Groups (Group modules **MXBK-2002**)
- Assignable to any one of four VCA Groups (Group modules **MXBK-2002**)
- Switchable 48V Phantom Power (effective for Mic inputs only)
- Large Channel Mute switch
- Audio phase reversible

- Three-band Equalizer with sweepable (150 Hz. to 5 kHz.) mid-frequency
- Peak indicator
- Assignable to dynamic processor (in Dynamics module **MXBK-2003**)

1.3.4.2 Stereo Input Module MXBK-2004

The Stereo Input module accepts line inputs only, and the standard **MXBK-2004** module is fitted with two line input cards, **MXBK-LI21**. Electronically balanced line input cards (**MXBK-LI22**) are optionally available.

The major features of the Stereo Input Module are:

- Stereo inputs selectable from three sources
- Stereo Three-band Equalizer with sweepable (150 Hz. to 5 kHz.) mid-frequency
- Assignable to dynamic processor (in Dynamics module **MXBK-2003**)
- One stereo and two mono sends with pre-Fader/post-Fader selector
- Peak indicator triggered on highest of the two channel levels
- Assignable to Groups 1 and 2 or 3 and 4, or direct to stereo mix
- Assignable to any one of four VCA Groups (in Group modules **MXBK-2002**)
- Selectable mono left, mono right and reverse stereo functions
- Reversible audio phase

1.3.4.3 Other I/O Modules

In addition to the I/O modules described above, I/O module **MXBK-2001E** is optionally available, this comprising a basic I/O module with no line input or microphone input cards fitted.

1.3.5 Group Module MXBK-2002

The optional Group modules provide both audio and VCA grouping functions. The standardized console system incorporates four Group modules, these being of fixed configuration and having no optional plug-in cards. Group module features include:

- One Return channel with PFL and SOLO functions
- One stereo and two mono sends with pre-fader/post-fader selection
- Three-band Equalizer with sweepable (150 Hz. to 5 kHz.) mid-frequency
- Equalizer assignable to either Group or Return
- Large Group Mute switch
- Peak indicator
- Assignable to dynamic processor (Dynamics modules **MXBK-2003**)

1.3.6 Dynamics Module MXBK-2003

The Dynamics module also is optional, and is used to provide the console with four compressor/limiters, all with separate thresholds. This is a fixed-configuration module with no optional plug-in cards. Only one Dynamics module can be fitted to the console.

1.4 OPTIONAL EQUIPMENT

In addition to the those mentioned for the system modules, several other options are available for the console. Each of these is described briefly in paragraphs 1.4.1 through 1.4.3.

1.4.1 Editor Interface MXBK-EI21

The Editor Interface (EIC) option provides a means of implementing control from most popular types of editors so as to control certain functions in the **MXP-2000** series consoles, its applications being particularly significant in the area of television post-production work. In this application, the EIC allows audio to follow video in accordance with the video edit decision list.

The EIC offers considerable flexibility, and presents the user with a wide range of operational choices. These choices include:

- Single or dual ramp operation
- Up or down operation on each ramp
- Active high or active low command logic
- Ability to jumper control to any channel
- Normal or automute modes
- Cross fade and/or cut operations

1.4.2 Relay Card, MXBK-RL21

These optional cards can be added to any number of I/O modules. The option can be programmed so as to provide EITHER Automatic PFL when the I/O module Fader is set to full down position, or Reverse Talkback facilities to such stations (one RLC card for each station) as may be desired.

1.5 SPECIFICATIONS

NOTES:
0 dB=0.775 V
0 dBu=0.775 V (no load specified)
0 dBm=0.775 V into 600 ohms

1.5.1 General Specifications

Frequency Response	±0.5 dB (30 Hz. to 20 kHz.)
Harmonic Distortion	0.05% (+20 dB at 1 kHz.)
Equivalent Input Noise	-124 dB (terminated with 150 ohms)
Noise Level:	
Master Fader Closed	-95 dB
Channel Fader Closed	-75 dB
All Faders at ref. level	Better than -75 dB
Crosstalk:	
Channel to Channel	-80 dB at 16 kHz.
Bus to Bus	-65 dB at 16 kHz.
Maximum Overall Gain	72 dB w/600 ohms load Impedance
Internal Oscillator:	
Frequency	Adjustable 150 Hz. to 15 kHz.
Output Level	+12 dBu max.
Harmonic Distortion	Less than 0.05% at 1 kHz.

1.5.2 Input Specifications

Line Input

Number of Input Channels	12/16
Reference Level	0 dBu or +4 dBu
Maximum Input Level	+27 dBu
Input Impedance	10 kilohms at 1 kHz.

Common Mode Rejection Ratio at:

	100 Hz.	1000 Hz.	10 kHz.	16 kHz.
With Transformer	85 dB	65 dB	48 dB	43 dB
Transformerless	70 dB	63 dB	50 dB	48 dB

Microphone Input

Number of Input Channels	12/16
Reference Level	-70 dBu, -50 dBu or -30 dBu
Maximum Input Level	-30 dBu, -20 dBu or +10 dBu
Input Impedance	1.2 kilohms at 1 kHz.
Common Mode Rejection Ratio	70 dB at 16 kHz.

Return Input

Number of Input Channels	4
Reference Level	0dB
Maximum Input Level	+27 dB
Input Impedance	10 kilohms at 1 kHz.
Common Mode Rejection	56 dB at 16 kHz.

1.5.3 Output Specifications

Channel Output

Number of channels	12
Reference Level	0 dBm into 600 ohms
Maximum Output Level	+25 dBm into 600 ohms
Output Impedance	200 ohms at 1 kHz.

Group Output

Number of output Channels	4
Reference Level	0 dB into 600 ohms
Maximum Output Level	+25 dBm into 600 ohms
Output Impedance	200 ohms at 1 kHz.

Stereo Output

Number of output channels	1
Reference Level	0 dB into 600 ohms
Maximum Output Level	+25 dBm into 600 ohms
Output Impedance	200 ohms at 1 kHz.

Send Output

Number of output Channels	4
Reference Level	0 dB into 600 ohms
Maximum Output Level	+25 dBm into 600 ohms
Output Impedance	200 ohms at 1 kHz.

1.5.4 Equalizer Specifications

High Frequency:

Frequency Range	10 kHz.
Gain Range	± 12 dB

Mid Frequency:

Frequency Range	150 Hz. to 5 kHz.
Gain Range (±2dB)	± 12 dB

Low Frequency:

Frequency Range	80 Hz.
Gain Range	± 12 dB

High Pass Filter

Cutoff Frequency (-3 dB)	80 Hz.
Slope	12 dB/Octave

1.5.5 Dynamic Processing

Compressor

Threshold	-20 dB to +10 dB
Attack Time	1 to 5 msec.
Recovery Time	25 msec. to 1000 msec.
Ratio	1.5:1 to 5:1

Limiter

Threshold	-12 dB to +12 dB
Attack Time	100 microsec.
Recovery Time	500 microsec.
Ratio	20:1

1.5.6 Power Supply

Input Voltage	100-120 VAC or 220-240 VAC
Power Consumption	225 Watts
Operating Temperature Range	-10°C to +35°C (+14°F to + 95°F)
Storage Temperature Range	-20°C to +60°C (-4°F to +140°F)

SECTION 2
INSTALLATION

2.1 INTRODUCTION

The **MXP-2000** console is shipped with all modules in place, thus minimizing installation time and effort. The unpacking and installation procedures for the console are presented in this section of the manual.

2.2 INSTALLATION PLANNING

Before installation is carried out, the space, power, and environmental requirements of the equipment must be considered. The following paragraphs are presented as guidelines for installation planning.

2.2.1 Space Requirements

The physical dimensions for the console are illustrated in Figure 2-1, and the table cutout dimensions are shown in Figure 2-2. When considering console placement, this information can be used in drawing up an overall floor plan. Such a plan should take into account the space requirements for all of the peripheral equipment, as well as that for the console itself.

The power supply is designed for mounting in a standard 19-inch equipment rack. Its panel height is 5.25 in. (133.5 mm), and the total depth of the package is 12.5 in. (317.5 mm).

2.2.2 Environmental Requirements

The console should be operated in an environment such that it is not subjected to temperatures greater than 35 degrees C. (95 degrees F.) or humidity in excess of 80% (non-condensing). Further, to avoid excessive heat build-up in the equipment, an unrestricted flow of air is essential.

The heat dissipated by the console is approximately 900 BTUs/hr. For all practical purposes, this will require about one sixth of a ton of cooling capacity, and, if necessary, the room air conditioning should be adjusted accordingly.

2.2.3 Power Requirements

The total power consumption of the console is approximately 280 watts, with nominal input voltages of 100, 120, 220 or 240 VAC at 50/60 Hz. Detailed instructions for making power supply input connections are given in paragraphs 2.4.2.2 and 2.4.2.3.

2.3 UNPACKING

The console is shipped in a wooden crate whose sides are held together by means of Klimp fasteners. To unpack the console, the Klimp fasteners are pried off with a screwdriver, claw hammer, or other suitable tool, and the crate is disassembled, starting from the top cover. Once the cover and sides are removed, the console becomes directly accessible for removal to its planned location.

2.4 INSTALLATION

2.4.1 Equipment Location

Since the physical location of the console depends largely on the type of facility available, it is not possible to give specific, detailed procedures for selecting its location. However, the guidelines presented in these paragraphs should be followed as closely as possible.

When the equipment location is being selected, consideration must be given not only to the console and power supply, but also to the peripheral equipment which will be used with the console. Further, since different operating applications will require different peripherals, space must be allowed for equipment to be moved around the console. As final considerations, ease of operation and accessibility for service also must be borne in mind.

Once the console is placed in position, the power supply location must be determined. The power supply is designed for installation in a standard 19-in. rack or cabinet. Its panel height is 5.25 inches (133.5 mm), and the total depth of the package (including ground lug) is 12.5 inches (317.5 mm). An additional space of at least four inches must be allowed behind the supply for cables and connectors. Further, because it is convection cooled, a minimum space of three inches must be provided above and below the power supply.

Power supply location requires careful planning, since it must be placed in such a position as to avoid elec-

VOLTAGE LABEL DISPLAYED	INPUT VOLTAGE LIMITS	FUSE RATING
100	90-110 VAC	2.5 A.
120	108-132 VAC	2.5 A.
220	198-242 VAC	1.25 A.
240	216-264 VAC	1.25 A.

Table 2-1. Input Voltage Limits

MEASUREMENT POINT (CNJ42 PIN #)	NOMINAL VOLTAGE (VDC)	LIMITS (VDC) MIN	MAX
6	+ 5 (LOGIC)	+ 4.8	+ 5.2
7	+ 5 (REF)	+4.995	+5.005
8	−18	−17.5	−18.5
9	+18	+17.5	+18.5
10	+48	+47.5	+48.5

Table 2-2. Power Supply Voltage Limits

tromagnetic interference with the console or other equipment while remaining within the confines of its cable length, this being 18 feet (5.49 meters).

2.4.2 Electrical Connections

The following paragraphs describe the electrical connections for the console and power supply.

CAUTION

DO NOT CONNECT POWER TO THE EQUIPMENT UNTIL THESE PARAGRAPHS HAVE BEEN READ AND UNDERSTOOD

2.4.2.1 Grounding

When making electrical connections to the console, it is most important that system grounding be carried out correctly. It is strongly recommended that the procedures and practices detailed in Appendix C be followed as closely as possible. It should be noted that the main ground lug on the rear panel of the power supply provides a suitable grounding point for the console.

2.4.2.2 Power Supply to Console Connections

The power supply is connected to the console by means of a single cable which, for shipping purposes, is stored in the connector bay at the rear of the console, immediately below the Meter Housing. This cable is pre-connected at the console end, and all that is required to complete the connection is to plug the cable connector into the appropriate socket on the rear panel of the power supply, and then install the connector retaining bracket.

2.4.2.3 Power Supply Input Connections

The power supply is designed to be operated from nominal input voltages of 100, 120, 220 or 240 VAC at 50/60 Hz. Table 2-1 lists the voltage input limits and fuse ratings for each of the nominal voltages.

Input voltage selection is made by correctly inserting a small card into the fuseholder (see Figure 2-3). The procedure is given below:

STEP 1. Determine the local power line voltage.

STEP 2. Disconnect the power cable from the rear panel of the supply.

STEP 3. Slide the small plastic window (next to the power input connector) to the left.

STEP 4. Look into the lower part of the opening revealed in STEP 3, and observe the small plug-in card. Note the voltage label that is visible on the card.

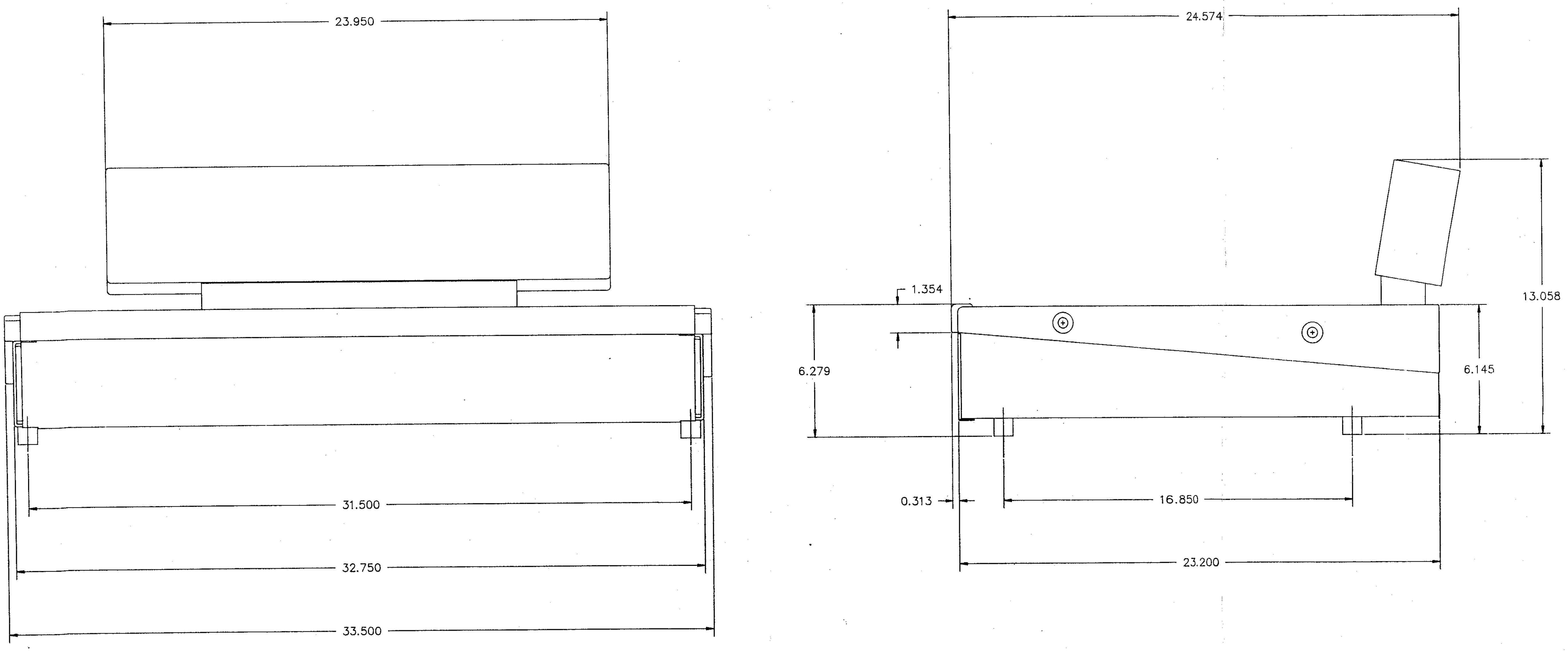

23.950
31.500
32.750
33.500
24.574
1.354
6.279
6.145
13.058
0.313
16.850
23.200

Figure 2-1. Console Dimensions

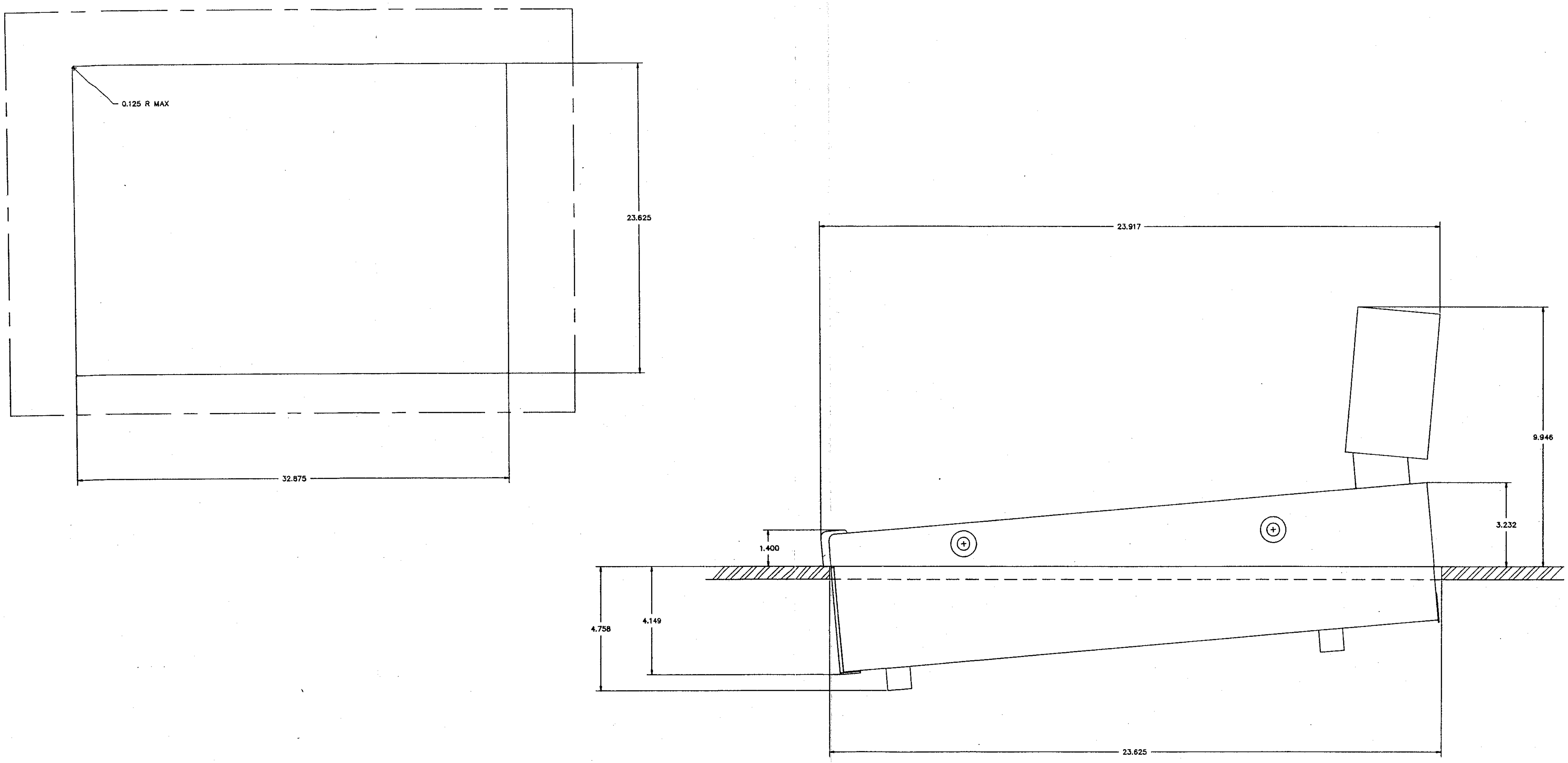

0.125 R MAX
23.625
32.875
23.917
9.946
3.232
1.400
4.149
4.758
23.625

Figure 2-2. Table Cutout Dimensions

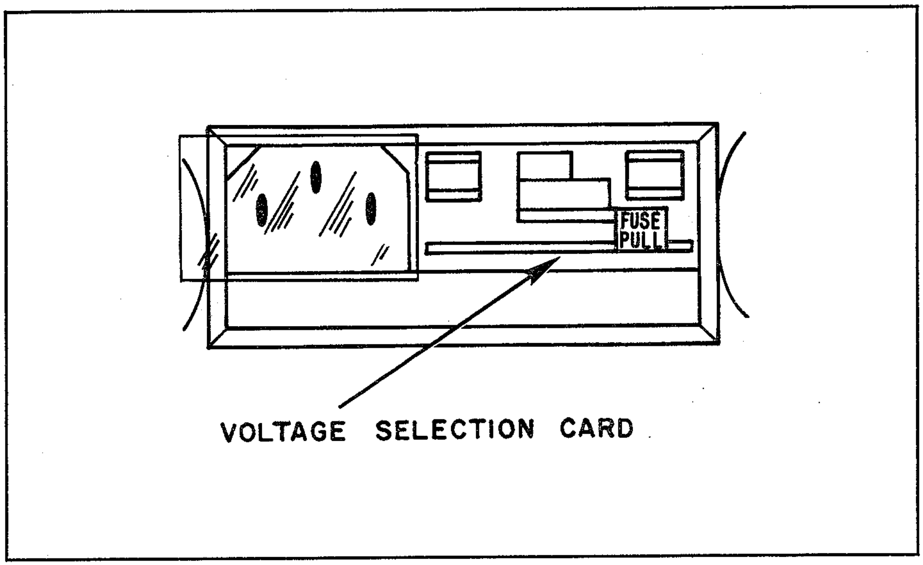


Figure 2-3. Fuseholder

STEP 5. If the voltage marked on the card does not correspond to the line voltage determined in STEP 1, pull out the card and reinsert it so that the voltage label seen on the card is the one closest to the available line voltage.

STEP 6. Verify that the fuse is correct in accordance with the line voltage (see Table 2-1), and change the fuse if necessary.

STEP 7. Slide the plastic window to the right, and reconnect the power cable.

2.4.2.4 Power Supply Voltages

The power supply output voltages can be measured at barrier strip CNJ42. To gain access to the barrier strip, the module at the extreme right-hand end of the console is removed. The barrier strip is located in the bottom of the console frame, close to the rear panel.

Figure 2-4 illustrates the barrier strip, and shows the points at which the power supply outputs can be measured. The limits for these voltages are listed in Table 2-2.

2.4.3 External Equipment Connections

All external equipment connections from the console are made through the connector bay at the rear of the console. Figure 2-5 illustrates the signals which are present on the input/output connectors as they are associated with specific modules. The multipin connectors are identical in format, and the signals on their pins depend upon module locations. For instance, if a Master module is inserted into the extreme left-hand slot (as seen from the front of the console), then the signals on the associated connector (at the extreme right-hand end as seen from the rear of the console) are those listed under Master module in Figure 2-5 (Sheet 1).

It should be noted that no external connections are made to or from the Dynamics module.

REAR OF CONSOLE

VOLTAGE	CNJ42	WIRE COLOR
CHAS GND	①	GRN
SPARE	②	
5V AC	③	YEL/WHT
5V AC	④	YEL/WHT
CT	⑤	YEL/ORG
+5V	⑥	
+5V REF	⑦	ORG/WHT
−18V	⑧	BRN
+18V	⑨	GRY
+48V	⑩	RED
GND	⑪	WHT 12ga
GND	⑫	BLK
GND	⑬	VIO
GND	⑭	BLU
GND	⑮	ORG/BLK
GND	⑯	WHT 12ga

Figure 2-4. Power Supply Barrier Strip

PIN #	MASTER MODULE	MONITOR MODULE	COMMUNICATION MODULE
1	N.C.	N.C.	N.C.
2	ON AIR 2 RLY N/C	STUDIO HP B LEFT	* TALKBACK/PFL OUT
3	ON AIR 1 RLY N/C	STUDIO HP A LEFT	N.C.
4	REHEARSE 2 RLY N/O	B RLY N/C	N.C.
5	REHEARSE 1 RLY N/O	A RLY COM	N.C.
6	N.C.	STUDIO LS LEFT LOW	N.C.
7	N.C.	CONT RM LS RIGHT HIGH	N.C.
8	MONO HIGH	CONT RM LS LEFT HIGH	TB IN 4 HIGH
9	MIX B RIGHT HIGH	EXT 4 RIGHT HIGH	TB IN 3 HIGH
10	MIX B LEFT HIGH	EXT 4 LEFT HIGH	TB IN 2 HIGH
11	MIX A RIGHT HIGH	EXT 3 RIGHT HIGH	TB IN 1 HIGH
12	MIX A LEFT HIGH	EXT 3 LEFT HIGH	TB OUT 5 HIGH
13	SEND 3 HIGH	EXT 2 RIGHT HIGH	TB OUT 4 HIGH
14	SEND 2 HIGH	EXT 2 LEFT HIGH	TB OUT 3 HIGH
15	SEND 1 RIGHT HIGH	EXT 1 RIGHT HIGH	TB OUT 2 HIGH
16	SEND 1 LEFT HIGH	EXT 1 LEFT HIGH	TB OUT 1 HIGH
17	ON AIR 2 RLY COM	STUDIO HP B COM	GROUND
18	ON AIR 1 RLY COM	STUDIO HP A COM	N.C.
19	REHEARSE 2 RLY COM	B RLY COM	N.C.
20	REHEARSE 1 RLY COM	A RLY N/C	N.C.
21	N.C.	STUDIO LS RIGHT HIGH	N.C.
22	N.C.	CONT RM LS RIGHT LOW	N.C.
23	GROUND	GROUND	GROUND
24	GROUND	GROUND	GROUND
25	GROUND	GROUND	GROUND
26	GROUND	GROUND	GROUND
27	GROUND	GROUND	GROUND
28	GROUND	GROUND	GROUND
29	GROUND	GROUND	GROUND
30	N.C.	N.C.	N.C.
31	ON AIR 2 RLY N/O	STUDIO HP B RIGHT	* CONSOLE L.S. AMP
32	ON AIR 1 RLY N/O	STUDIO HP A RIGHT	N.C.
33	REHEARSE 2 RLY N/C	B RLY N/O	N.C.
34	REHEARSE 1 RLY N/C	A RLY N/O	N.C.
35	N.C.	STUDIO LS RIGHT LOW	N.C.
36	N.C.	STUDIO LS LEFT HIGH	N.C.
37	MONO LOW	CONT RM LS LEFT LOW	TB IN 4 LOW
38	MIX B RIGHT LOW	EXT 4 RIGHT LOW	TB IN 3 LOW
39	MIX B LEFT LOW	EXT 4 LEFT LOW	TB IN 2 LOW
40	MIX A RIGHT LOW	EXT 3 RIGHT LOW	TB IN 1 LOW
41	MIX A LEFT LOW	EXT 3 LEFT LOW	TB OUT 5 LOW
42	SEND 3 LOW	EXT 2 RIGHT LOW	TB OUT 4 LOW
43	SEND 2 LOW	EXT 2 LEFT LOW	TB OUT 3 LOW
44	SEND 1 RIGHT LOW	EXT 1 RIGHT LOW	TB OUT 2 LOW
45	SEND 1 LEFT LOW	EXT 1 LEFT LOW	TB OUT 1 LOW

NOTES:
N.C.= Not Connected
RLY N/C = Normally Closed Relay contact
RLY N/O = Normally Open Relay Contact
RLY COM = Relay Common Contact
HP = Headphones
LS = Loudspeaker
TB = Talkback

* In REV 6 and later modules, pins 2 and 31 must be jumpered together if PFL/Talkback is to be monitored at Meter Housing speaker.

Figure 2-5. External Connections (Sheet 1 of 2)

PIN #	I/O MODULE	GROUP MODULE	STEREO INPUT MODULE
1	N.C.	N.C.	N.C.
2	REVERSE TB	N.C.	STOP 3
3	COUGH A SELECT	N.C.	STOP 2
4	MUTE A SELECT	N.C.	STOP 1
5	B RLY N/C	N.C.	OUTPUT R HIGH
6	A RLY N/C	N.C.	OUTPUT L HIGH
7	* PATCH SEND	GROUP PATCH SEND	INPUT 3 R HIGH
8	OUTPUT SHIELD	** 2-MIX RET	INPUT 3 L HIGH
9	OUTPUT HIGH	** 2-MIX SEND	INPUT 2 R HIGH
10	GROUND	N.C.	INPUT 2 L HIGH
11	GROUND	GROUND	GROUND
12	INPUT 2 SHIELD	RETURN HIGH	GROUND
13	INPUT 2 HIGH	N.C.	INPUT 1 R HIGH
14	GROUND	N.C.	GROUND
15	INPUT 1 SHIELD	GROUND	GROUND
16	INPUT 1 HIGH	GROUP OUT HIGH	INPUT 1 L HIGH
17	REVERSE TB COM	N.C.	PRE OUT R (TEST)
18	COUGH COM	N.C.	START/STOP COMMON
19	MUTE COM	N.C.	GROUND R
20	B RLY COM	N.C.	GROUND L
21	A RLY COM	N.C.	PRE OUT L (TEST)
22	PATCH COM	GROUP PATCH SHIELD	***INPUT 3 R LOW
23	GROUND	GROUND	GROUND
24	GROUND	GROUND	GROUND
25	GROUND	GROUND	GROUND
26	GROUND	GROUND	GROUND
27	GROUND	GROUND	GROUND
28	GROUND	GROUND	GROUND
29	GROUND	GROUND	GROUND
30	N.C.	N.C.	N.C.
31	N.C.	N.C.	START 3
32	COUGH B SELECT	N.C.	START 2
33	MUTE B SELECT	N.C.	START 1
34	B RLY N/O	N.C.	OUTPUT R LOW
35	A RLY N/O	N.C.	OUTPUT L LOW
36	* PATCH RET	GROUP PATCH RETURN	***INPUT 3 R LOW
37	OUTPUT SHIELD	N.C.	INPUT 3 L LOW
38	OUTPUT LOW	2-MIX SHIELD	INPUT 2 R LOW
39	GROUND	N.C.	INPUT 2 L LOW
40	GROUND	GROUND	GROUND
41	INPUT 2 SHIELD	RETURN LOW	GROUND
42	INPUT 2 LOW	N.C.	INPUT 1 R LOW
43	GROUND	N.C.	GROUND
44	INPUT 1 SHIELD	GROUND	GROUND
45	INPUT 1 LOW	GROUP OUT LOW	INPUT 1 L LOW

NOTES:

* Pins must be jumpered together if no external unit is connected to Patch
** Pins must be jumpered together if no external unit is connected to Patch
*** Depending upon Stereo Input module Revision level, INPUT 3 R LOW may be connected to either pin 22 (Rev 1) or pin 36 (Rev 2)

N.C. = Not Connected
RLY N/C = Normally Closed Relay contact
RLY N/O = Normally Open Relay Contact
RLY COM = Relay Common Contact
TB = Talkback

Figure 2-5. External Connections (Sheet 2 of 2)

2.4.3.1 Connector Configuration

The pin configuration for the input/output connectors is illustrated in Figure 2-6. The illustration is laid out to show the connector as it is seen from the rear of the console.

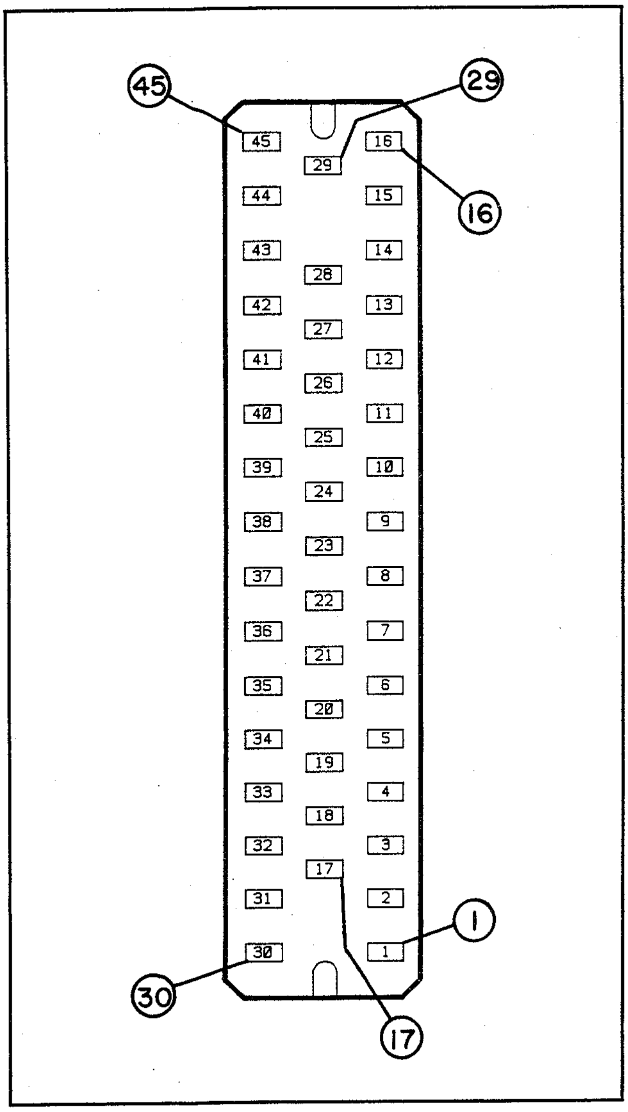


Figure 2-6. External Equipment Connector Configuration

2.4.3.2 Mating Connectors

Mating plugs for the external connectors are supplied with the console. Assembly instructions for these plugs are given in the following procedure and Figure 2-7.

STEP 1. Wire the connector (1) as required

STEP 2. Open the connector housing package, and find the small bag containing the connector mounting hardware (2 & 3) and cover plate (10)

STEP 3. Install the connector mounting hardware (2 & 3) as illustrated, but do not tighten

STEP 4. Open the connector housing by removing the retaining nuts and bolts (4 & 5)

STEP 5. Remove or loosen the strain relief mounting screws (8)

NOTE: It is recommended that the strain relief be mounted so as to allow the cable to exit from the side of the connector toward the rear of the console

STEP 6. Install the connector assembly in the lower clam shell (7) so that the connector tabs (2) fit into the slots as indicated by the arrows

STEP 7. Route the cable through the strain relief clamp (9), and install and tighten the clamp screws (8)

STEP 8. Install the cover plate (10) in the unused exit port

STEP 9. Install the upper clam shell (6) and retaining hardware (4 & 5)

STEP 10. Tighten the connector mounting screws (3)

2.5 SYSTEM CONFIGURATION JUMPERS

The operational flexibility offered by the various possible module arrangements in the **MXP-2000** series consoles is further enhanced by means of a series of jumper connections on the various modules. These jumpers allow the modules to be set up so as to provide the console configuration best suited to the users requirements. The functions of all of the jumper connections are described in the following paragraphs.

2.5.1 I/O Module

2.5.1.1 Ground Reference Selection (JW1 through JW6)

Jumpers JW1 through JW6 are used to select the appropriate ground references (audio ground or chassis ground) for the INPUT 1, INPUT 2, and LINE OUT signals. All consoles are shipped from the factory with the chassis ground jumpers, JW4, JW5 and JW6 installed. As a general rule, where the input signal is

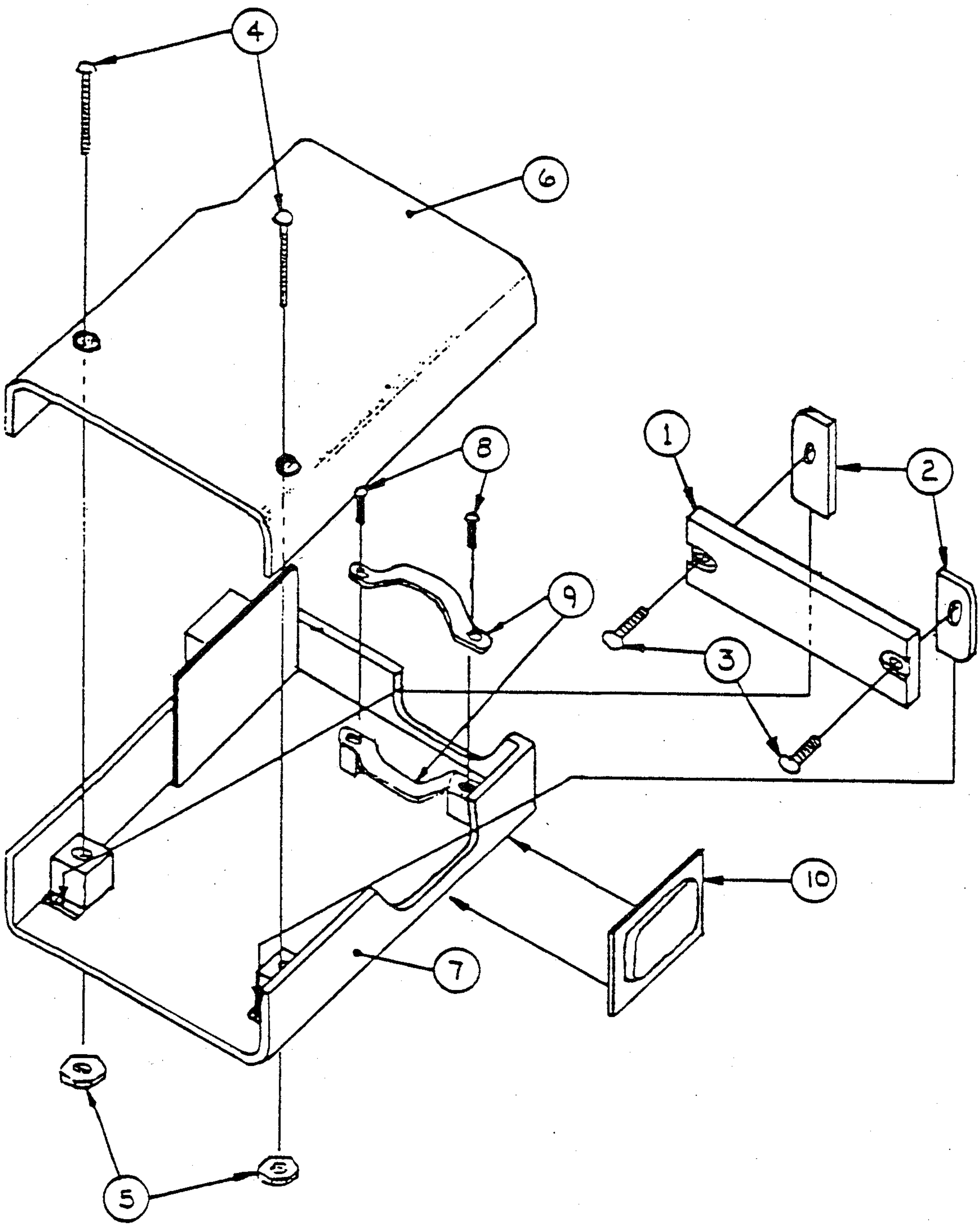

4
6
8
1
2
9
3
10
7
5

Figure 2-7. Mating Connector Assembly

STATE AT POWER-UP		JUMPER CONFIGURATIONS							
CHANNEL	LAMP	JW7	JW8	JW9	JW10	JW11	JW12	JW13	JW14
ON*	ON	X	—	X	—	—	X	—	X
ON	OFF	X	—	X	—	—	—	X	X
OFF	ON	X	—	X	—	X	X	—	—
OFF	OFF	X	—	X	—	X	—	X	—

X = Jumper installed
— = Jumper not installed
* = Factory Setting

Table 2-3. Channel and Mute Indicator Programming

to be derived from a capacitor type microphone, the chassis ground jumpers should be removed and replaced with audio ground jumpers. For all other microphone types, chassis ground should be preferred.

The specific functions for jumpers JW1 through JW6 are listed below:

JW1	Connects the LINE OUT shield to audio ground.
JW2	Connects INPUT 2 shield to audio ground.
JW3	Connects INPUT 1 shield to audio ground.
JW4	Connects the LINE OUT shield to chassis ground.
JW5	Connects INPUT 2 shield to chassis ground.
JW6	Connects INPUT 1 shield to chassis ground.

CAUTION

WHEN AN AUDIO GROUND JUMPER IS INSTALLED, THE CORRESPONDING CHASSIS GROUND JUMPER MUST BE REMOVED, AND VICE-VERSA. FAILURE TO DO THIS CAN CREATE GROUND LOOPS AND CAUSE EXCESSIVE SYSTEM NOISE.

2.5.1.2 Channel ON or OFF at Power-up (JW7 through JW14)

The I/O modules can be programmed so as to be ON (unmuted) or OFF (muted) at power-up. In addition, the mute lamp can be programmed so as to be either illuminated or extinguished to indicate a muted condition. The desired power-up conditions are established by means of JW7 through JW14.

NOTE: The power-up conditions described here are controlled by a reset signal from the Master module. To achieve these conditions, the Master module must be in place and Master module JW11 must be installed.

Consoles shipped from the factory have jumpers JW7, JW9, JW12 and JW14 installed. This arrangement causes the channel to be unmuted when power is first applied to the console. In addition, it programs the mute indicator so that it becomes illuminated when the channel is ON.

Since four (and only four) jumpers are installed for any desired configuration, there are many possible arrangements, but any of these arrangements MUST be subject to the following rules:

- Of the four jumpers JW7 through JW10, two, and only two jumpers may be installed. Where JW7 is installed, JW9 also must be installed. Similarly, where JW8 is installed, JW10 also must be installed. Jumpers JW7 and JW8 may never be installed together, nor may JW9 and JW10.
- Of the four jumpers, JW11 through JW14, two, and only two, may be installed together. Where JW11 is installed, JW14 must be removed, and vice-versa. Similarly, where JW12 is installed, JW13 must be removed, and vice-versa.

In practice, any desired program can be implemented by moving JW10, JW12, JW13 and JW14 while jumpers JW7 and JW9 are left in place. These jumper combinations are listed in Table 2-3.

2.5.1.3 Automatic PFL (JW15)

If so desired, those I/O modules fitted with optional Relay Card MXBK-RL21 can be set up so that PFL (Pre-Fader Listening) is automatically switched on when the Fader is set to the full down position. To incorporate this function, JW15 should be installed. Conversely, if the automatic PFL function is not required, JW15 should not be installed. On consoles shipped from the factory, JW15 is NOT installed.

STATE AT POWER-UP		JUMPER CONFIGURATIONS					
GROUP	LAMP	JW1	JW2	JW3	JW4	JW5	JW6
ON*	ON	—	X	X	—	X	—
OFF	OFF	—	X	—	X	—	X
OFF	ON	X	—	X	—	X	—
ON	OFF	X	—	—	X	—	X

X = Jumper installed
— = Jumper not installed
* = Factory Setting

Table 2-4. Group Module Indicator Programming

2.5.1.4 Output to Dynamics Module (JW16 and JW17)

Consoles shipped from the factory have JW16 in place, this causing the pre-Equalizer signal to be fed to the Dynamics module (WHEN SELECTED). If it is desired that the post-Equalizer signal be used, JW16 should be removed, and JW17 should be installed. It should be noted that, with JW17 installed, the signal to the Dynamics module is always equalized, regardless of EQ switch setting. This feature allows the Dynamics module to be equalized without necessarily modifying the Channel signal, and is particularly useful for special effects or other similar purposes.

2.5.1.5 Monitor Muting (JW18 through JW21)

Jumpers JW18 through JW21 are used, in conjunction with two external connections, to program MUTE A and/or MUTE B as required. To enable the MUTE A function, an external connection must be made between ground and pin 4 on the I/O module's input/output connector. Similarly, to enable MUTE B, a connection must be made between ground and pin 33. These connections, together with jumpers JW18 through JW21, provide automatic muting when the Fader is moved off the full down position; MUTE A becoming effective when INPUT 1 is selected, and MUTE B becoming effective when INPUT 2 is selected.

Depending upon the jumpers used, MUTE A mutes the signals at the control room monitor (JW18 installed), the studio monitor (JW19 installed), or both monitors (JW18 and JW19 installed). Similarly, MUTE B mutes the signals at the control room monitor (JW20 installed), the studio monitor (JW21 installed), or both monitors (JW20 and JW21 installed).

It should be noted that a manual control for MUTE A can be provided by connecting a switch, rather than a link, between ground and input/output connector pin 4. Similarly, a switch connected between ground and pin 33 can provide a manual control for MUTE B.

2.5.1.6 Test Jumper (JW22)

Later Revisions of the I/O module have one additional jumper, JW22. This jumper is provided to enable certain service procedures, and must NOT be removed.

2.5.2 Group Module

2.5.2.1 Group Module ON or OFF at Power-up (JW1 through JW6)

The Group Modules can be programmed so as to be ON (unmuted) or OFF (muted) at power-up. In addition, the mute lamp can be programmed so as to be either illuminated or extinguished to indicate a muted condition. The desired power-up conditions are established by means of JW1 through JW6.

NOTE: The power-up conditions described here are controlled by a reset signal from the Master module. To achieve these conditions, the Master module must be in place and Master module JW11 must be installed.

Consoles shipped from the factory have jumpers JW2, JW3, and JW5 installed, and this arrangement causes the Group module to be unmuted and the mute indicator to be illuminated when power is first applied to the console.

A complete list of all of the permissible jumper combinations for JW1 through JW6 is given in Table 2-4. No attempt should be made to use any jumper configuration other than those listed in the table. Further, when installing these jumpers, the following rules MUST be observed:

- Of the four jumpers JW3 through JW6, two, and only two jumpers may be installed. Where JW3 is installed, JW5 also must be installed. Similarly, where JW4 is installed JW6 also must be installed.

Jumpers JW3 and JW4 may never be installed together, nor may JW5 and JW6.

- Of the two jumpers, JW1 and JW2, one, and only one, may be installed. Where JW1 is installed, JW2 must be removed, and vice-versa.

2.5.2.2 Output to Dynamics Module (JW7 and JW8)

The output signal from the Group module to the selected Dynamics module channel can be either pre-Fader/pre-Equalizer audio, or pre-Fader/ post-Equalizer audio, selection being made by installing either JW7 or JW8.

Consoles are shipped from the factory with JW7 installed, causing the pre-Fader/pre-Equalizer signal to be fed to the selected Dynamics module channel. If it is desired to feed the Dynamics module with the pre-Fader/post-Equalizer signal, JW7 should be removed and JW8 should be installed. It is important to note that JW7 and JW8 must NOT be installed together.

2.5.2.3 Group Module Definition (JW9 through JW20)

All of the Group modules are identical, and their assignments as GROUP 1, GROUP 2, etc., are defined by means of jumpers JW9 through JW20. The appropriate jumpers which must be installed to define each Group are listed in Table 2-5.

GROUP NUMBER	INSTALL JUMPERS
GP 1	JW9, JW13 and JW17
GP 2	JW10, JW14 and JW18
GP 3	JW11, JW15 and JW19
GP 4	JW12, JW16 and JW20

Table 2-5. Group Definition Jumpers

2.5.2.4 Signals to Audio Fader (JW21 through JW23)

The signal applied to the Audio Fader can be pre-VCA/pre-Equalizer, pre-VCA/post-Equalizer, or post-VCA audio, selection being made by installing JW21, JW22, or JW23. It should be noted that only one of these three jumpers should be installed.

Consoles are shipped from the factory with JW23 installed, and this jumper feeds pre-VCA/pre-Equalizer audio to the Fader. If it is desired to feed the pre-VCA/post-Equalizer signal to the Fader, JW23 should be removed, and JW21 should be installed. Similarly, if the post-VCA signal is required, JW23 should be removed, and JW22 should be installed.

2.5.2.5 Sub-group Muting (JW24, JW29 and JW30)

The Sub-group can be arranged so as to be controlled by the Group Mute switch. Consoles shipped from the factory have jumpers JW24 and JW29 installed, and, with these jumpers in place, pressing the Group Mute switch causes the Sub-group to become muted.

If it is desired to disable this muting control, JW24 and JW29 should be removed and JW30 should be installed.

2.5.2.6 Signals to Sub-group (JW25 through JW27)

The signal applied to the Sub-group can be pre-VCA/pre-Equalizer, pre-VCA/post-Equalizer, or post-VCA audio, selection being made by installing JW25, JW26, or JW27. It should be noted that only one of these three jumpers should be installed.

Consoles are shipped from the factory with JW25 installed, and this jumper feeds pre-VCA/pre-Equalizer audio to the Sub-group. If it is desired to feed the pre-VCA/post-Equalizer signal to the Fader, JW25 should be removed, and JW27 should be installed. Similarly, if the post-VCA signal is required, JW25 should be removed, and JW26 should be installed.

2.5.2.7 Group Muting (JW28)

Consoles shipped from the factory have JW28 installed, and this allows the Group audio channel to be muted by means of the Group Mute switch. In cases where it is desired to eliminate this muting function, JW28 should be removed.

2.5.2.8 VCA Inputs (JW31 and JW32)

The signal applied to the Group module VCA can be either post-Equalizer audio or Patch Return audio, selection being made by means of either JW31 or JW32. The standard console has JW31 installed, and this feeds the post-Equalizer signal to the VCA input. If it is desired to apply the Patch Return signal to the VCA, JW31 should be removed, and JW32 should be installed.

2.5.2.9 Patch Send Signals (JW33 and JW34)

The signal to the Patch Send can be either pre-VCA/post-Equalizer or post-VCA audio, depending upon whether JW33 or JW34 is installed. Neither of these jumpers is installed at the factory, and the user is left to make his own selection. Where it is desired to feed the Patch Send with pre-VCA/post Equalizer signals, JW33 should be installed. Conversely, where it is desired to use the post-VCA signal, JW34 should be installed.

FOR ACN INPUTS FROM:	INSTALL JUMPERS					
	JW12	JW13	JW14	JW15	JW16	JW17
MIX BUSES*	X	—	—	X	—	—
GP 1 & 2 BUSES	—	X	—	—	X	—
GP 3 & 4 BUSES	—	—	X	—	—	X

X = Jumper installed — = Jumper not installed * = Factory Setting

Table 2-6. ACN Inputs

2.5.2.10 Group Output (JW35 and JW36)

The GROUP OUT signal can be derived from either the Patch Return or the VCA output. Jumper JW36 is installed at the factory, and this causes the VCA output to be used for the GROUP OUT signal. If it is desired to use the Patch Return for GROUP OUT, JW36 should be removed, and JW35 should be installed.

2.5.2.11 SOLO Bus Signals (JW37 through JW40)

Jumpers JW37 through JW40 are used to direct the desired signals to the SOLO left and SOLO right buses. Only two of these jumpers should be installed, and they should be either both odd-numbered jumpers (JW37 and JW39) or both even-numbered jumpers (JW38 and JW40).

The standard arrangement from the factory includes JW38 and JW40, and these jumpers feed the audio Sub-group signals to the SOLO left (JW40) and SOLO right (JW38) buses.

If it is desired to supply post-VCA Group signals to the SOLO buses, JW38 and JW40 should be removed, and JW37 and JW39 should be installed.

2.5.2.12 Test Jumpers (JW41 and JW42)

In later Revisions of the Group module, two additional jumpers, JW41 and JW42 are included. JW41 is provided to enable the performance of certain test procedures, and JW42 is for a future provision. These jumpers MUST NOT be removed.

2.5.3 Master Module

2.5.3.1 Off Air Muting (JW1 and JW2)

The Master module can be programmed so that the main output automatically becomes muted in modes other than ON AIR, i.e. when REH (Rehearse) is selected or when neither REH nor ON AIR is selected. This is accomplished by installing JW1. If this automatic muting function is desired, the factory-installed jumper, JW2, should be removed, and JW1 should be installed.

2.5.3.2 MONO Outputs (JW3 through JW6)

The signals used to create the MONO output can be derived from either one of the seperated A or B mixes, selection being made by means of jumpers JW3 through JW6. Of these four jumpers, two, and only two may be installed, and these should be either both even-numbered jumpers (JW4 and JW6) or both odd-numbered jumpers (JW3 and JW5).

Consoles shipped from the factory have JW4 and JW6 installed, and these direct the A MIX to the MONO summing circuit. If it is desired to use the B MIX for the MONO output, JW4 and JW6 should be removed, and JW3 and JW5 should be installed.

2.5.3.3 B MIX Output (JW7 through JW10)

The B MIX output can be derived from either pre-VCA or post-VCA signals, and this selection is made by jumpers JW7 through JW10. Of these four jumpers, two, and only two may be installed, and these should be either both even-numbered jumpers (JW8 and JW10) or both odd-numbered jumpers (JW7 and JW9).

Jumpers JW8 and JW10 are installed at the factory, and these feed the pre-VCA signal to the B MIX output. If it is desired to use the post-VCA signal, JW8 and JW10 should be removed, and JW7 and JW9 should be installed.

2.5.3.4 Reset Jumper (JW11)

The reset which is used to control the power-up status of the I/O, Group and Stereo Input modules (see paragraphs 2.5.1.2, 2.5.2.1, and 2.5.5.4) will be generated only if JW11 in the Master module is in place. For manual (non-automated) console operations, this jumper must not be removed, since doing so will cause the power-up conditions at the I/O and Group modules to become random.

2.5.3.5 Left and Right ACN Inputs (JW12 through JW17)

The inputs to the left channel and right channel ACNs can be taken from the MIX L and MIX R buses or from the GROUP buses, selection being made with jumpers JW12 through JW17. It should be noted that this programming option is NOT permissible where Group modules are installed in the console.

Of these six jumpers, two, and only two may be installed, one for the left channel and the other for the right channel. The left channel can be fed from the MIX L bus (JW12), the GROUP 1 bus (JW13) or the GROUP 3 bus (JW14). Similarly, the right channel can be fed from the MIX R bus (JW15), the GROUP 2 bus (JW16) or the GROUP 4 bus (JW17). The jumpers required to obtain the desired inputs are synopsized in Table 2-6.

2.5.4 Monitor Module

2.5.4.1 MON (Monitor) Indicator (JW1 and JW2)

The MON indicator can be programmed so as to be either extinguished or illuminated when the Monitor is unmuted. Consoles from the factory have JW2 installed, this causing the MON indicator to be illuminated when the Monitor is unmuted. If it is desired to have the MON indicator extinguished when the Monitor is unmuted, JW2 should be removed, and JW1 should be installed.

2.5.4.2 AUTO MUTE Indicator (JW3 and JW4)

The AUTO MUTE (Automatic Mute) indicator can be programmed so as to be either illuminated or extinguished when automatic muting is selected. This function is used only in conjunction with the Editor Interface Card, and, when selected, mutes those Editor-controlled channels which are not currently active.

Consoles are shipped from the factory with JW3 installed, causing the AUTO MUTE indicator to become illuminated when automatic muting is selected. If it is desired that the AUTO MUTE indicator be extinguished when automatic muting is in effect, JW3 should be removed, and JW4 should be installed.

2.5.4.3 BYPASS Indicator (JW5 and JW6)

The BYPASS indicator also is used only with the Editor Interface Card, and can be either illuminated or extinguished when control from the Editor Interface Card is bypassed. Factory-programmed consoles have JW6 installed so that the BYPASS indicator is illuminated when the Editor control is bypassed. If it is desired to have the indicator extinguished when the Editor control is bypassed, JW6 should be removed, and JW5 should be installed.

2.5.4.4 Power-up Status (JW7 through JW10)

The Monitor module can be programmed to assume either one of two states at power-up, these being:

a. Monitor Unmuted, Editor NOT Bypassed, and Automatic Mute On, or

b. Monitor Muted, Editor Bypassed, and Automatic Mute Off.

The power-up status is programmed by means of JW7 through JW10. If JW7 and JW10 are installed, condition a. will prevail at power-up. Conversely, if JW8 and JW9 are installed (factory setting), condition b. will prevail.

2.5.4.5 Control Room Monitor Muting/Dimming (JW11 and JW12)

The control room monitors can be arranged so as to be either dimmed or fully muted when monitor muting is in effect, this being accomplished with jumpers JW11 and JW12. If full muting is desired, JW11 and JW12 should be installed (factory setting). If dimming is required rather than full muting, JW11 and JW12 should be removed.

2.5.4.6 MONO Metering (JW13 and JW14)

The MONO signal level can be displayed on the left channel meter only, or on both left and right channel meters, this optional selection being made by installing either JW13 or JW14. If it is desired to monitor the MONO signal on the left meter only, JW14 should be installed (factory setting). Where it is desired to monitor the MONO signal on both left and right meters, JW14 should be removed, and JW13 should be installed.

2.5.4.7 Monitor Muting (JW15)

In the standard factory configuration (JW15 installed), the MON switch is used to mute/unmute both the Studio and the Control Room monitors. If so desired, the Monitor module can be programmed so that the Studio montior does not respond to MON switch muting, this being accomplished by removing JW15.

It should be noted that JW15 is not present on some earlier modules. If it is desired to eliminate Studio monitor muting in these modules, resistor R141 should be removed from the Monitor module's MML subassembly.

2.5.5 Stereo Input Module

2.5.5.1 Ground Reference Selection (JW1/JW2 and JW101/JW102)

CAUTION

WHEN AUDIO GROUND JUMPERS ARE INSTALLED, THE CHASSIS GROUND JUMPERS MUST BE REMOVED, AND VICE-VERSA. FAILURE TO DO THIS CAN CREATE GROUND LOOPS AND CAUSE EXCESSIVE SYSTEM NOISE.

Jumpers JW1, JW2, JW101 and JW102 are used to select the appropriate ground reference (audio ground or chassis ground) for the LINE OUT L and

LINE OUT R cable shield. All consoles are shipped from the factory with the chassis ground jumpers, JW2 and JW101 installed.

The specific functions for the ground selection jumpers are listed below:

JW1	Connects the LINE OUT L shield to audio ground.
JW2	Connects the LINE OUT L shield to chassis ground.
JW101	Connects the LINE OUT R shield to chassis ground.
JW102	Connects the LINE OUT R shield to audio ground.

2.5.5.2 Unused Jumpers JW3 through JW8

Jumpers JW3 through JW8 are not incorporated in current versions of the Stereo Input module.

2.5.5.3 Automatic PFL (JW9)

If so desired, the Stereo Input module can be set up so that PFL (Pre-Fader Listening) is automatically switched on when the Fader is set to the full down position. To incorporate this function, JW9 should be installed. Conversely, if the automatic PFL function is not required, JW9 should not be installed. On consoles shipped from the factory, JW9 is NOT installed.

2.5.5.4 Channel ON or OFF at Power-up (JW10 through JW17)

The Stereo Input channels can be programmed so as to be ON (unmuted) or OFF (muted) at power-up. In addition, the mute lamp can be programmed so as to be either illuminated or extinguished to indicate a muted condition. The desired power-up conditions are established by means of JW10 through JW17.

NOTE: The power-up conditions described here are controlled by a reset signal from the Master module. To achieve these conditions, the Master module must be in place and Master module JW11 must be installed.

Consoles shipped from the factory have jumpers JW10, JW13, JW15 and JW17 installed. This arrangement causes the channel to be unmuted when power is first applied to the console. In addition, it programs the mute indicator so that it becomes illuminated when the channel is ON.

Since four, and only four jumpers are installed for any desired configuration, there are many possible arrangements, but any of these arrangements MUST be subject to the following rules:

- Of the four jumpers JW14 through JW17, two, and only two jumpers may be installed. Where JW14 is installed, JW16 also must be installed. Similarly, where JW15 is installed, JW17 also must be installed. Jumpers JW14 and JW17 may never be installed together, nor may JW15 and JW16.
- Of the four jumpers, JW10 through JW13, two, and only two, may be installed together. Where JW10 is installed, JW11 must be removed, and vice-versa. Similarly, where JW12 is installed, JW13 must be removed, and vice-versa.

In practice, any desired program can be implemented by moving JW10, JW11, JW12 and JW13 while jumpers JW15 and JW17 are left in place. These jumper combinations are listed in Table 2-7, below.

2.5.5.5 Automation Control (JW18 and JW19)

As shipped from the factory, both JW18 and JW19 are installed in manually operated consoles, and these should be removed ONLY when an Automation system is incorporated.

STATE AT POWER-UP		JUMPER CONFIGURATIONS							
CHANNEL	LAMP	JW10	JW11	JW12	JW13	JW14	JW15	JW16	JW17
ON*	ON	X	—	—	X	—	X	—	X
ON	OFF	X	—	X	—	—	X	—	X
OFF	ON	—	X	—	X	—	X	—	X
OFF	OFF	—	X	X	—	—	X	—	X

X = Jumper installed — = Jumper not installed * = Factory Setting

Table 2-7. Stereo Channel and Mute Indicator Programming

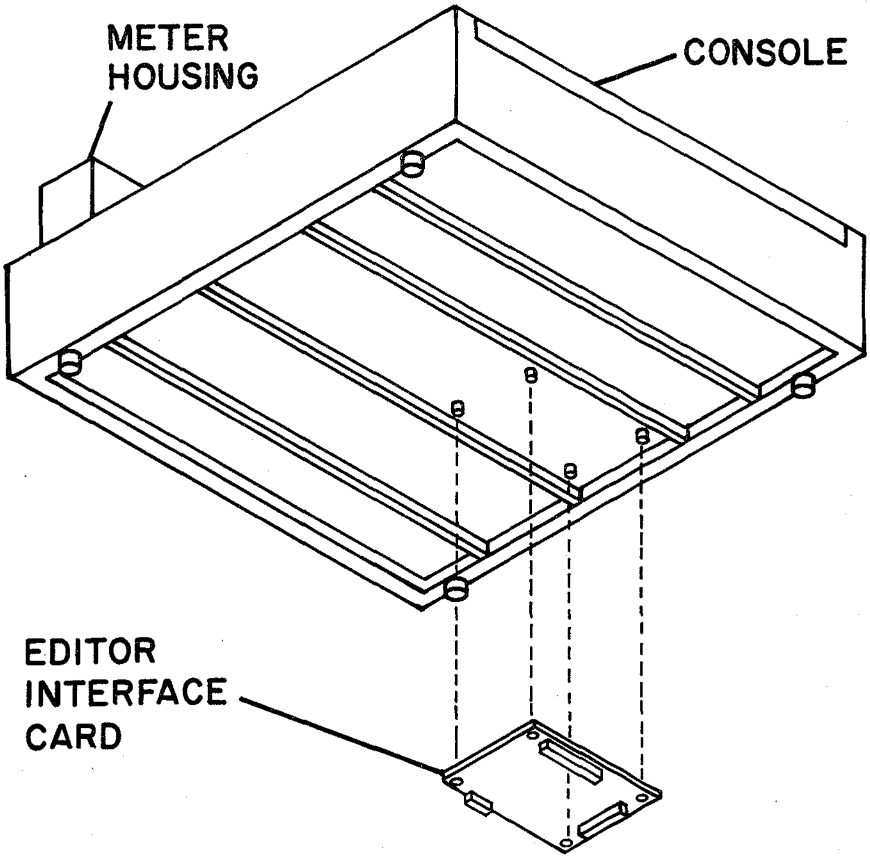

METER
HOUSING
CONSOLE
EDITOR
INTERFACE
CARD

Figure 2-8. Editor Interface Installation

2.5.6 Summary of Factory-installed Jumpers

The jumpers installed at the factory are summarized below:

- INPUT/OUTPUT modules: JW3, 5, 6, 7, 9, 12, 14, 16, 18 and 21
- MASTER MODULE: JW2, 4, 6, 8, 10, 11, 12 and 15
- STEREO INPUT MODULE: JW2, 10, 13, 15, 17, 18, 19 and 101
- MONITOR MODULE: JW2, 4, 6, 8, 9, 11, 12, 14 and 15
- GROUP MODULES: All – JW2, 3, 5, 7, 23, 24, 25, 28, 29, 31, 36, 38 and 40

PLUS:
GP1 – JW9, 13 and 17
GP2 – JW10, 14 and 18
GP3 – JW11, 15 and 19
GP4 – JW12, 16 and 20

2.6 EDITOR INTERFACE CARD, MXBK-EI21

The Editor Interface Card, commonly called the EIC, provides a the intermediate circuitry which allows editors to be used in controlling some of the operational aspects of the **MXP-2000** console. The EIC becomes most significant in post-production applications for television, where it allows audio to follow video in accordance with a video edit list.

2.6.1 Interface Card Installation

The EIC is mounted within a metal channel on the underside of the console, as illustrated in Figure 2-8. Installation is carried out as detailed below:

STEP 1. Taking great care to avoid damage to the controls, turn the console upside-down and remove the bottom cover.

STEP 2. Remove the Dummy Editor board (DEB) and disconnect the three ribbon cables from that board.

STEP 3. Connect the three ribbon cables to the EIC, and install it in the position vacated by the DEB.

STEP 4. Replace the bottom cover on the console, and return it to its normal position.

2.6.2 External Connections

Connections from the EIC to the editor are made via connectors mounted at the rear of the console on the neck of the Meter Housing (see Figure 2-9). The wiring harnesses used in making connections differ in accordance with the type of editor, the console configuration, and the connector (25-pin or 50-pin) used.

2.6.2.1 Standard Console Configurations

The EIC can control modules in up to eight locations in the **MXP-2000** frame, and these may be either Input (Input/Output or Stereo) modules, or a combination of Input modules and Group modules.

Jumper blocks on the EIC provide the means of selecting the modules to be controlled, and the following paragraphs describe the jumper arrangements that can be used in the standard console, as shipped from the factory. The standard console has Input modules in locations 1 through 12 and Group modules in locations 13 through 16.

There are two rows of jumper pin pairs, these being labelled CNJ1 and CNJ2. The pins on CNJ1 are used to steer the editor control signals, and those on CNJ2 are used to steer the signals to the LED arrow indicators. It is most important to note that the jumper arrangement on CNJ1 must be EXACTLY duplicated on CNJ2.

The jumper arrangement in consoles shipped from the factory is such that Input modules #1 through #8 are

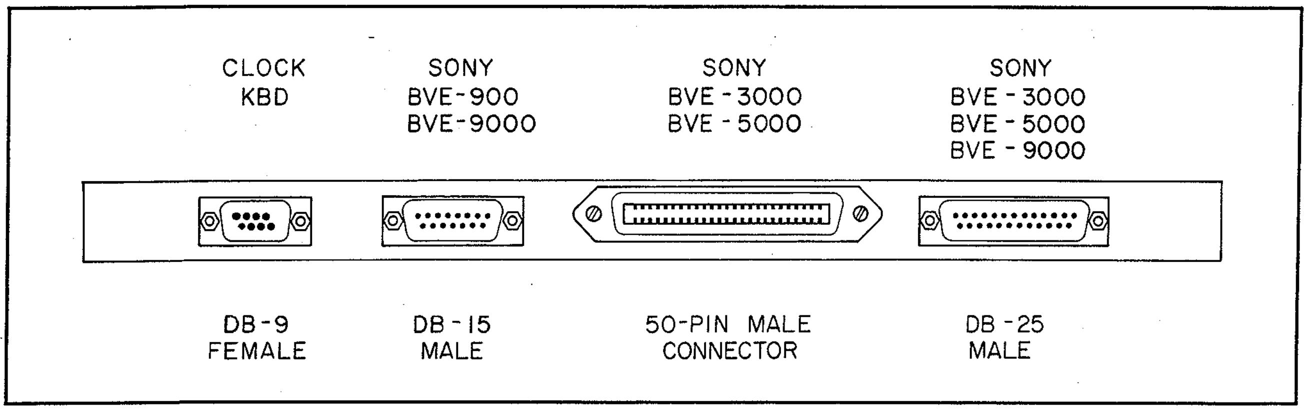


Figure 2-9. Editor Connectors

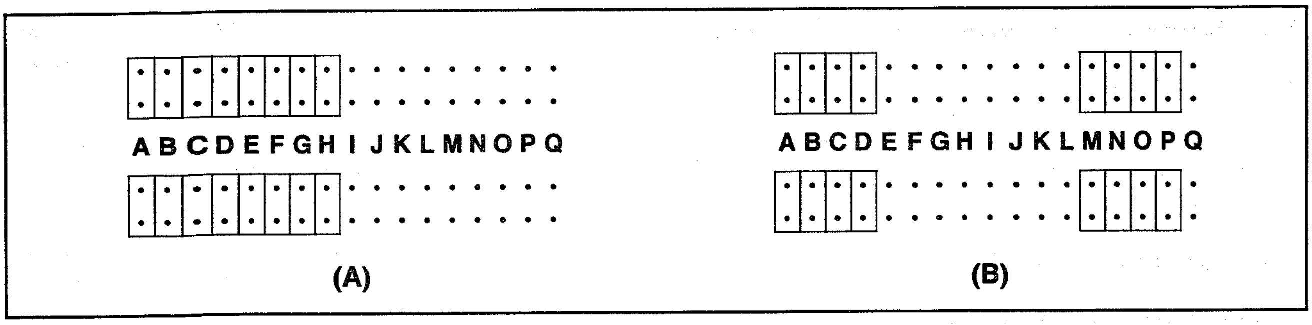

A B C D E F G H I J K L M N O P Q
(A)
A B C D E F G H I J K L M N O P Q
(B)

Figure 2-10. Standard Console Jumper Arrangement

selected. In this configuration, jumper blocks are installed at locations A through H, as illustrated in Figure 2-10(A).

Where it is desired to control a combination of Input and Group modules, this is accomplished by simply rearranging jumper blocks. It is important to note, however, that the four leftmost Input modules must be retained as part of the combination, and that the jumper blocks at locations A through D should not be moved. Further, where a combination is to be controlled, it is necessary that the combination must include an even number of Group modules.

Figure 2-10(B) illustrates the jumper configuration that must be used where all four Group modules are to be placed under editor control. In this arrangement, the jumper blocks at locations E, F, G and H have been moved to locations M, N, O and P, causing Group modules 1, 2, 3 and 4 to be controlled by editor channels 8, 7, 6 and 5, respectively.

CAUTION

THE JUMPER AT LOCATION Q IS NOT ASSOCIATED WITH MODULE CONFIGURATION. DO NOT INSTALL A JUMPER AT THIS LOCATION

Where it is desired to bring Group modules 1 and 2 under editor control, jumper blocks E and F should be moved to locations M and N. Similarly, where it is desired to control Group modules 3 and 4, jumper blocks G and H should be moved to locations O and P.

2.6.2.2 Non-Standard Console Configurations

The console is so arranged that any module can be fitted into any location, and where the user has taken advantage of this feature, the EIC jumpers must be rearranged accordingly.

Where editor-controlled Input or Group modules are installed in locations other than those used in the standard configuration, this leads to changes in the EIC jumper configuration. Further, since the pins being jumpered together are not adjacent to each other, these jumpers must be installed by means of wire-wrapped links rather than the usual jumper blocks.

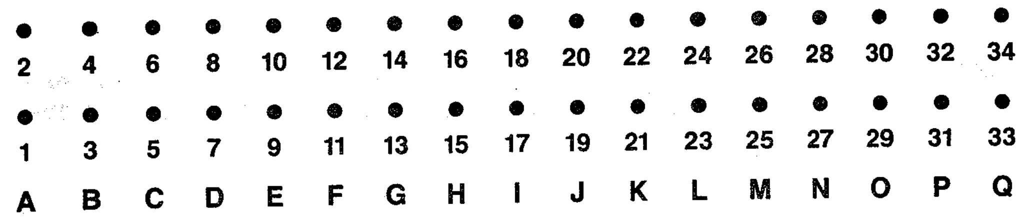
The pin numbering and functions for CNJ1 and CNJ2 are identical, and these are illustrated in Figure 2-11. It should be noted that, since they are of no concern in this discussion, the functions for the pins at location Q (pins 33 and 34) are not listed in the illustration.

As can be seen from the table in Figure 2-11, the control inputs from the editor are present on the first eight pins in the upper row, and output connections to locations 1 through 16 are on the pins in the lower row. Output connections to locations 17 through 20 are on pins 18 through 24 in the upper row. (The repeated control inputs for editor channels 8, 7, 6 and 5 are provided as a means of making Group module connections to locations 13, 14, 15 and 16 in the standard configuration.)

In the standard configuration, the control inputs from the editor (even numbered pins 2 through 16) are connected by means of the jumper blocks to locations 1 through 8. When any module that is to be controlled by the editor is placed in some location other than 1 through 8, its jumper block must be removed, and the control input must be directed to the appropriate location by means of a wire link.

As an example, the case is assumed in which Input modules 1 and 2 are installed in console locations 16 and 17 respectively. As shown in the table in Figure 2-11, the control input from editor channel 1 is on jumper pin 2 and the control output connection for location 16 is on jumper pin 31. To transfer channel 1 control from location 1 to location 16, the standard jumper block is removed from between pins 1 and 2, and a wire link is connected between pin 2 (EDITOR CH 1 IN) and pin 31 (LOCATION 16 OUT). Similarly, to transfer channel 2 control from location 2 to location 17, the standard jumper block is removed from between pins 3 and 4, and a wire link is installed be-

PIN LOCATIONS:



FUNCTION TABLE:

UPPER ROW PIN	FUNCTION	LOWER ROW PIN	FUNCTION
2	EDITOR CH 1 IN	1	LOCATION 1 OUT
4	EDITOR CH 2 IN	3	LOCATION 2 OUT
6	EDITOR CH 3 IN	5	LOCATION 3 OUT
8	EDITOR CH 4 IN	7	LOCATION 4 OUT
10	EDITOR CH 5 IN	9	LOCATION 5 OUT
12	EDITOR CH 6 IN	11	LOCATION 6 OUT
14	EDITOR CH 7 IN	13	LOCATION 7 OUT
16	EDITOR CH 8 IN	15	LOCATION 8 OUT
18	LOCATION 20 OUT	17	LOCATION 9 OUT
20	LOCATION 19 OUT	19	LOCATION 10 OUT
22	LOCATION 18 OUT	21	LOCATION 11 OUT
24	LOCATION 17 OUT	23	LOCATION 12 OUT
26	EDITOR CH 8 IN	25	LOCATION 13 OUT
28	EDITOR CH 7 IN	27	LOCATION 14 OUT
30	EDITOR CH 6 IN	29	LOCATION 15 OUT
32	EDITOR CH 5 IN	31	LOCATION 16 OUT

Figure 2-11. Jumper Pin Locations and Functions

tween pin 4 (EDITOR CH 2 IN) and pin 24 (LOCATION 17 OUT). This jumper arrangement is illustrated in Figure 2-12.

2.6.3 Wiring Harnesses

For console operation with the **SONY BVE-3000A** and **BVE-5000** editors, the wiring harness from the editor to the console can be connected to either the DB 25 (25-pin) connector or the 50-pin connector on the neck of the meter housing. The harness pin-to-pin wiring varies in accordance with the types of module to be controlled, the various possibilities being: all I/O modules, all Stereo Input modules, or a combination of I/O and Stereo Input modules. It should be noted that, insofar as these interconnections are concerned, Group modules are dealt with in exactly the same manner as I/O modules.

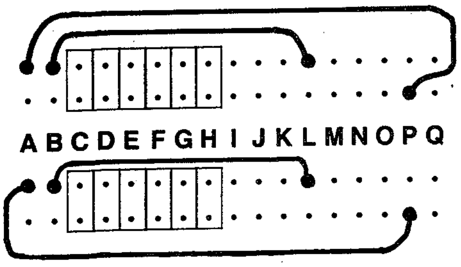


Figure 2-12. Wire Links

2.6.3.1 Harness for 50-Pin Connector

Table 2-8 lists the various pin-to-pin harness connections for the different console configurations. In the table, column 1 (EDITOR) lists the pins on the 50-pin male connector which mates with the 50-pin female connector on the editor. Columns 2 (SIM), 3 (MONO/GRP) and 4 (SIM/MONO) lists the pin connections for the 50-pin female connector which mates with the console, showing the connections which must be used for consoles using:

a. All Stereo Input modules (column 2),

b. All I/O modules or I/O and Group modules (column 3), or

c. A combination of Stereo Input and I/O modules (column 4).

COLUMN 1 EDITOR	COLUMN 2 SIM	COLUMN 3 MONO/GRP	COLUMN 4 SIM/MONO
1	N/C	N/C	N/C
2	1	1/2*	1
3	2	3/4*	2
4	3	5/6*	3
5	4	7/8*	4
6	5	N/C	5/6*
7	6	N/C	7/8*
8	7	N/C	N/C
9	N/C	N/C	N/C
10	9	9/10*	9
11	10	11/12*	10
12	11	13/14*	11
13	12	15/16*	12
14	13	N/C	13/14*
15	14	N/C	15/16*
16	15	N/C	N/C
17-32	N/C	N/C	N/C
33	33	33	33
34-48	N/C	N/C	N/C
49	49	49	49
50	N/C	N/C	N/C
	NOTE: * = Pins linked together		

Table 2-8. Editor to Console Connections (50-Pin)

2.6.3.2 Harness for DB 25 Connector

Table 2-9 is constructed in exactly the same manner as Table 2-8, and gives the pin-to-pin connections for the DB 25 connector harness.

COLUMN 1 EDITOR	COLUMN 2 SIM	COLUMN 3 MONO/GRP	COLUMN SIM/MONO
1	N/C	N/C	N/C
2	3	3/4*	3
3	4	5/6*	4
4	5	7/8*	5
5	6	9/10	6
6	7	N/C	7/8*
7	8	N/C	9/10*
8	9	N/C	N/C
9	N/C	N/C	N/C
10	11	11/12*	11
11	12	13/14*	12
12	13	15/16*	13
13	14	17/18*	14
14	15	N/C	15/16*
15	16	N/C	17/18*
16	17	N/C	N/C
17-32	N/C	N/C	N/C
33	1	1	1
34-48	N/C	N/C	N/C
49	19	19	19
50	N/C	N/C	N/C
	NOTE: * = Pins linked together		

Table 2-9. Editor to Console Connections (DB 25)

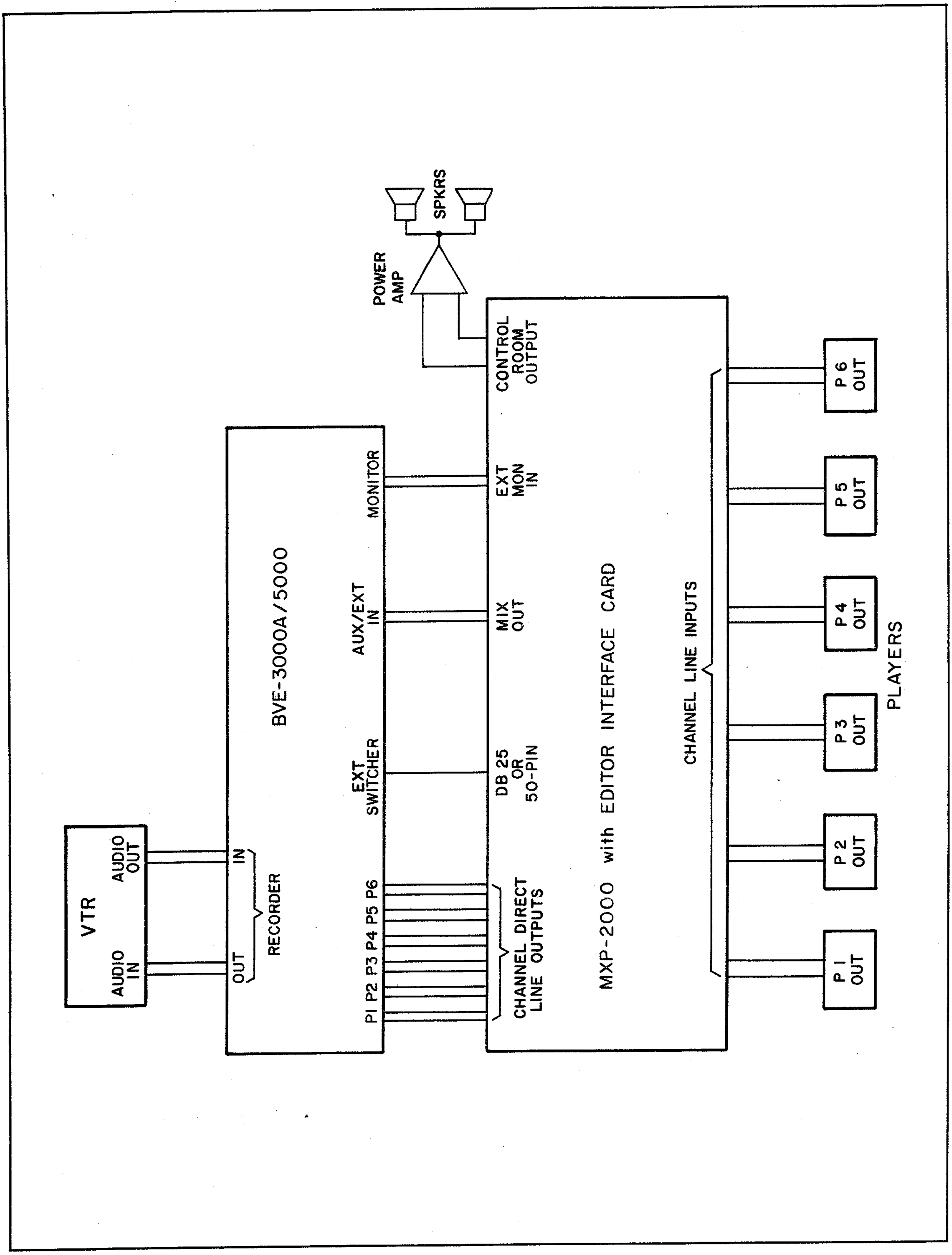

VTR
AUDIO IN
AUDIO OUT
IN
OUT
RECORDER
BVE-3000A/5000
P1 P2 P3 P4 P5 P6
EXT SWITCHER
AUX/EXT IN
MONITOR
CHANNEL DIRECT LINE OUTPUTS
DB 25 OR 50-PIN
MIX OUT
EXT MON IN
CONTROL ROOM OUTPUT
POWER AMP
SPKRS
MXP-2000 with EDITOR INTERFACE CARD
CHANNEL LINE INPUTS
P 1 OUT
P 2 OUT
P 3 OUT
P 4 OUT
P 5 OUT
P 6 OUT
PLAYERS

Figure 2-13. Editor to Console Connections

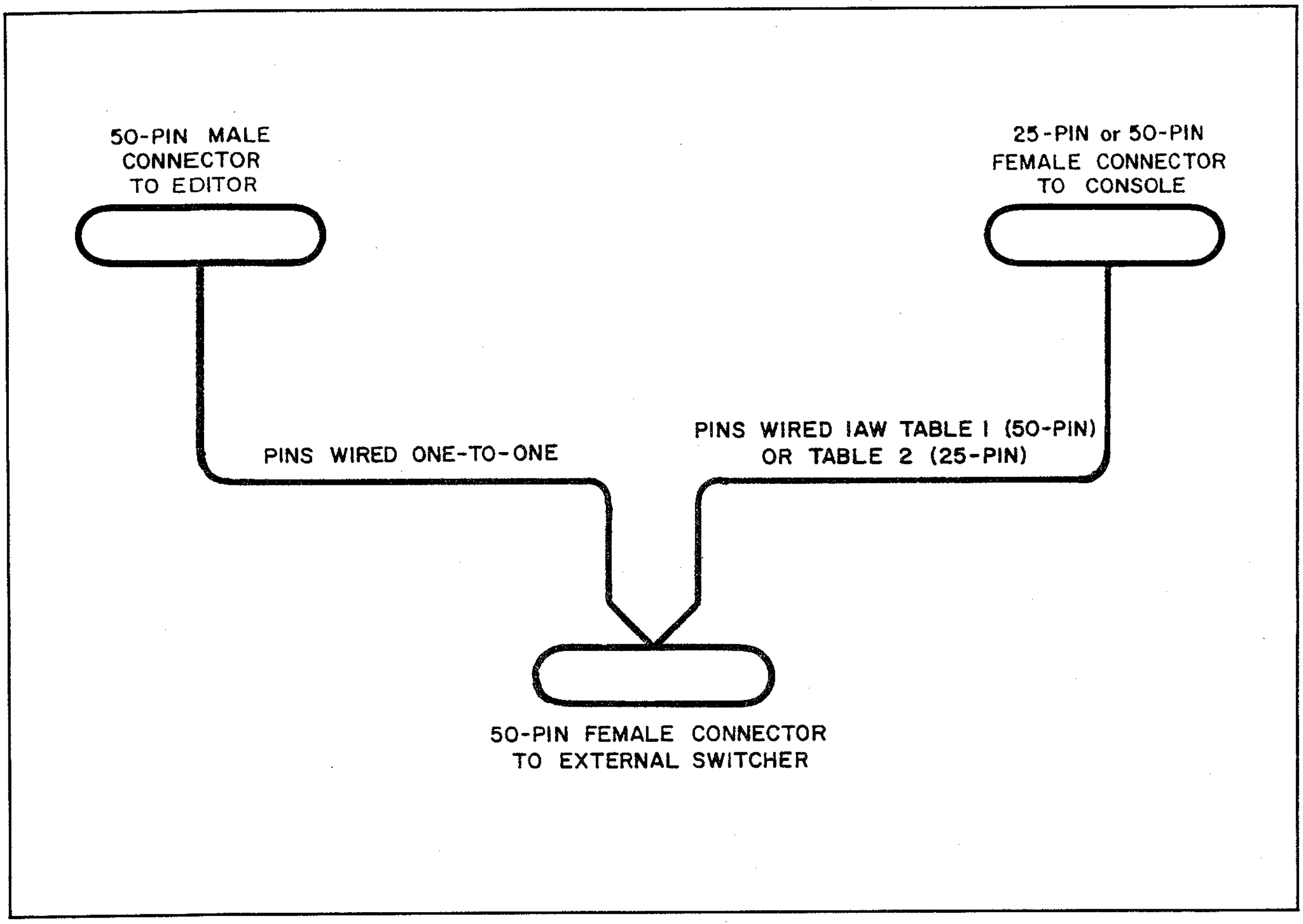

50-PIN MALE CONNECTOR TO EDITOR
25-PIN or 50-PIN FEMALE CONNECTOR TO CONSOLE
PINS WIRED ONE-TO-ONE
PINS WIRED IAW TABLE I (50-PIN) OR TABLE 2 (25-PIN)
50-PIN FEMALE CONNECTOR TO EXTERNAL SWITCHER

Figure 2-14. External Switcher Y-Cord

2.6.4 EIC with Sony BVE-5000 Editor

The Sony **BVE-5000 Editor** controls up to six stereo Players and provides output to one Video Tape Recorder. The console to editor connections for the BVE-5000 are shown in Figure 2-13. The player outputs, P1 through P6, are connected to the I/O or Stereo Input modules via the appropriate input/output connectors at the rear of the console, and the Direct Line Outputs from the modules are connected to the P1 through P6 inputs on the editor.

The cable between EXT SWITCHER on the editor and the 50-pin connector on the console should be wired in accordance with the information provided in Table 2-8. Where the DB 25 connector is used, the cable should be wired as detailed in Table 2-9. Either Mix A or Mix B from the console's Master module can be connected to AUX/EXT IN on the editor, but it is recommended that Mix A be preferred. The MONITOR output from the Editor is fed to any one of the EXT monitor connections on the Monitor module, and passed from there (via the power amplifier) to the Control Room monitor speakers.

2.6.5 EIC with Sony BVE-3000A Editor

The **BVE-3000A Editor** controls two stereo Players and provides output to one Video Tape Recorder. The general interconnections between the console and this editor are similar to those shown in Figure 2-13, differing only in the number of channels controlled and in the use of an external switcher, the latter leading to the need for a Y-cord connection between the editor and the 50-pin (or 25-pin) connector on the console.

Before the **BVE-3000A** is connected to the **MXP-2000** (with EIC) console, the editor's internal switcher must first be disabled in accordance with the procedure given in the Operation and Maintenance Manual for the editor. Switching then is accomplished by means of an external switcher such as the Grass Valley GVG-1600, Grass Valley GVG-1680, or equivalent.

As previously stated, using this arrangement leads to a requirement for a Y-cord which allows the external switcher to be connected into the system, and this is illustrated in Figure 2-14. The editor to console connections exactly duplicate those given in

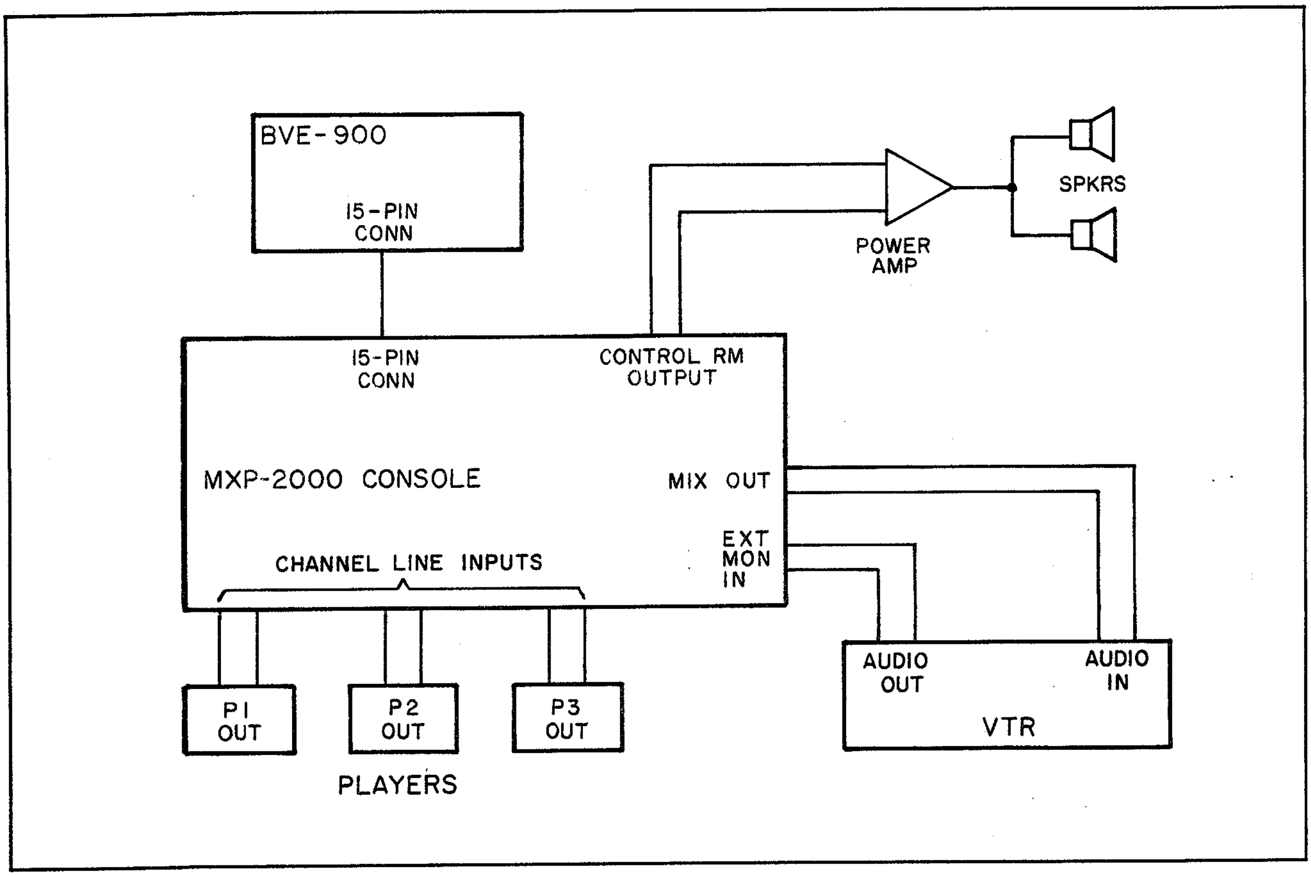


Figure 2-15. BVE-900 to Console Connections

Tables 2-8 and 2-9, differing only in that the switcher connector is added and wired one-to-one with the editor connector.

2.6.6. EIC with Sony BVE-900 Editor

The **BVE-900** editor controls up to three stereo Players, and can be used with any **MXP-2000** console that is fitted with either the Editor Interface Card or the Dummy Editor Board (DEB).

NOTE: Where the **MXP-2000** console is to be used with the **BVE-900**, certain console modifications become necessary. For further information, apply to SONY Professional Products Corporation.

Interconnection between the editor and the console is made via the 15-pin connector on the Meter Housing neck at the rear of the console (see Figure 2-9), the cable being fitted with miniature D-type connectors, one male and one female. The pin connections for this cable are one-to-one, i.e. pin 1 to pin 1, pin 2 to pin 2, etc.

The connection diagram for the **BVE-900** is given in Figure 2-15. As with other editors, the player outputs are connected to the I/O modules or Stereo Input modules via the input/output connectors at the rear of the console, but it should be noted that the audio input to the Video Tape Recorder is taken from the console's Mix output and not from the editor. Monitor loudspeaker connections are the same as those for the **BVE-3000A** and **BVE-5000** editors.

2.6.7 Editor Assignment Jumpers

As shipped from the factory, the Editor Interface Card has 16 jumper blocks fitted to CNJ7. In this configuration, Channel 1 in the EIC is controlled from Editor Control Channel 2, Channel 2 in the EIC is controlled from Editor Control Channel 3, and so on. This arrangement is necessary, because Editor Control Channel 1 always relates to the video black level signal, and is not normally desired for audio channel control.

If, for any reason, it is desired to direct the Editor Control Channels to their counterparts in the EIC, i.e. Channel 1 to Channel 1, Channel 2 to Channel 2, etc., the jumper blocks should be moved from CNJ7 to their equivalent positions on CNJ6. It should be noted that the 17th pairs of jumper pins, at the lower ends of CNJ6 and CNJ7, are not used.

SECTION 3
CONTROLS AND INDICATORS

3.1 INTRODUCTION

This section of the Manual describes the functions of all of the operating controls and indicators that are used in **MXP-2000** console operation.

3.2 CONSOLE LAYOUT

The console layout is designed to provide maximum flexibility together with the greatest possible ease of operation. All of the major modules are located in the console's main frame, and can be inserted in any order that the user may desire, thus allowing him/her to arrange the modules in the order that best suits his/her working methods.

All meters and status indicators for the console are located in the Meter Housing at the rear of the main frame. The four GROUP meters are at the left-hand end of the Meter Housing panel, and the 2-Mix LEFT and RIGHT meters are mounted in the top center section. The six status indicators are directly below the 2-Mix meters, and the four AUX meters are located, together with the PFL meter, in the top right section of the panel. The clock is directly below the AUX and PFL meters, and the loudspeaker is at the extreme right-hand end of the panel.

3.3 MODULE ASSEMBLIES

The seven major modules are illustrated in Figures 3-1 through 3-7. In each of these illustrations, callouts are used to point out the purpose and/or function of each control and indicator. The controls and indicators are arranged on the modules so that controls relating to either a single function, or to several similar functions, are placed together on different-colored sections of the panel. Paragraphs 3.4 through 3.10 provide detailed information on the controls and indicators in accordance with their panel arrangements.

Most of the controls and indicators on the module panels are specifically labelled, and the designations used in the illustration callouts and within this text exactly duplicate those used on the panels. It should be noted that the functions of unlabelled controls are usually self-evident, either from their position on the panel or from other, nearby labels. In Figures 3-1 through 3-7, and within this text, the unlabelled controls are assigned names which are indicative of their functions, and these names are used consistently throughout the text.

3.4 MASTER MODULE

The Master module (Figure 3-1) provides all of the master controls for the console's stereo output, and is mandatory to the system. Depending upon the module's jumper configuration, inputs can be derived from the Mix bus or Group buses. The main console outputs, designated Mix A and Mix B, are taken from this module.

3.4.1 AUX 3

The AUX 3 (Auxiliary Mix 3) section contains only two controls, these being the Level Control and the MUTE switch, both of which control the SEND 3 output. The functions of these controls are self-evident.

3.4.2 AUX 2

The AUX 2 control section is identical with AUX 3, differing only in that the controls are applicable to SEND 2 signals.

3.4.3 AUX 1

The AUX 1 section is similar to AUX 2 and AUX 3 in that it contains a MUTE switch and a Level Control. The MUTE switch serves exactly the same function as those in the AUX 3 and AUX 2 groups. However, since AUX MIX 1 is a stereo SEND, a dual level control is used, the outer control being applied to the left audio channel, and the inner control being applied to the right channel.

3.4.3.1 Mix B Control

In Addition to the Level Control and MUTE switch, the AUX 1 section contains the SEP (Separate) switch and the ST.B (Stereo B) control. When SEP is NOT selected, the Master module outputs, Mix A and Mix B are identical, and both are controlled by the Fader. However, when SEP is selected, the Mix B level is controlled by ST.B. It should be noted that, with factory-installed jumpers (JW8 and JW10), the Fader has no control over the Mix B signal once SEP has been selected. If it is desired that Mix B be controlled by both the Fader and ST.B when SEP is selected, JW8 and JW10 can be removed and replaced with JW7 and JW9.

3.4.4 REH/ON AIR

The REH/ON AIR section includes the REH, ON AIR and CLR switches, and these are used to select between rehearse and broadcast modes. When either mode is selected, the appropriate annunciator on the Meter Housing becomes illuminated to indicate that mode.

The ON AIR mode can be selected either when no mode has previously been entered, or when the console is in REH mode, this being accomplished by pressing ON AIR. However, it must be noted that REH mode can be selected ONLY from the no-mode condition, and cannot be selected directly if the console is in the ON AIR mode. To revert to REH mode from ON AIR, the ON AIR mode must first be cleared.

To clear the ON AIR mode, CLR must be held down while ON AIR is pressed. However, to clear REH mode, it is only necessary to press CLR.

3.4.5 Other Controls

The remaining controls on the Master module are the DYNAMIC switch and the Master Fader. The DYNAMIC switch is applicable only in those consoles fitted with the optional Dynamics module, and is used to assign the output to one of four channels in that module. The selected Dynamics module channel is indicated in the window directly to the left of the thumbwheel section of the switch. In Local operation (no Dynamics channel selected), the character L appears in the window.

The Master Fader always controls the level of the Mix A signal. Fader control of the Mix B level depends upon whether or not SEP is selected. When SEP is selected, the Mix B level is controlled by ST.B, and is unaffected by the Fader in those modules with factory-installed jumpers. (See paragraph 3.4.3.)

3.5 MONITOR MODULE

The Monitor module (Figure 3-2) controls the routing of Monitor and Meter outputs from the console. In addition to the external outputs, this module provides separate switching arrangements for the Control Room and Studio monitors. Level controls are provided for the Control Room loudspeakers, Control Room headphones, Studio headphones, and the SOLO bus. No optional plug-in cards are available for this module, which also is mandatory for system operation.

3.5.1 METER

The METER section contains four pushbutton switches, and these are used to select signals for monitoring on the LEFT and RIGHT meters in the Meter Housing. The switches are mechanically arranged so as to be mutually exclusive, i.e. selecting any switch automatically deselects all other switches.

The signals selected by the METER switches are self-evident in the cases of MIX A and MIX B. The SEL (Select) switch assigns the selected Control Room Monitor signal to the meters. The Ø (Phase) switch is used for monitoring the relative phases of the Mix A left and right channels, this being accomplished by showing the sum of the two signals on the LEFT meter and the difference between the two signals on the RIGHT meter.

3.5.2 CONTROL ROOM

The CONTROL ROOM section contains ten switches which are used to select signals for Control Room monitoring, a MONO summing switch, individual left channel and right channel muting switches, a Monitor mute switch, and three level controls.

3.5.2.1 Level Controls

The three level controls in the CONTROL ROOM group are used to adjust the SOLO listening level (SOLO), the volume at the Control Room Monitor speakers (MONITOR), and the signal level at the Control Room headphones (🎧).

3.5.2.2 Signal Selection Switches

The ten pushbutton switches immediately below the SOLO level control are used to select signals for the Control Room Monitor. These switches are mechanically arranged so as to be mutually exclusive.

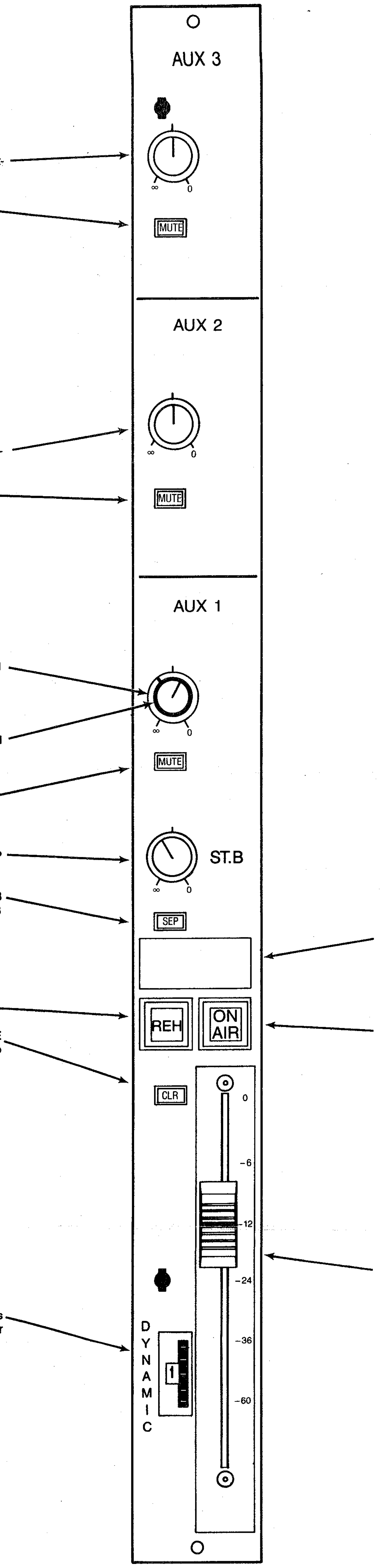
The four top switches, each labelled EXT, are used to select external signals (EXT 1 through EXT 4), these being connected via pins 9 through 16 and 38 through 45 on the Monitor module input/output connector at the rear of the console. (See Section 2, Figure 2-5, Sheet 1.)

Immediately below the EXT switches is the MONO switch, and this is used to direct the mono sum of the Mix A left and right signals to the Control Room monitors. This does not affect the stereo MIX bus or the Studio monitor system.

The remaining five switches, MIX A, MIX B, S1 (SEND 1), S2 (SEND 2) and S3 (SEND 3) are used to direct signals to the monitor in accordance with their labels.

3.5.2.3 Control Room Monitoring Switches

The MONO switch located immediately below the S3 switch is used to create the Monitor mono sum of the left and right channel signals selected by the Signal



Level Control — Adjusts AUX MIX 3 (SEND 3) output level

MUTE — Mutes AUX MIX 3 (SEND 3)

Level Control — Adjusts AUX MIX 2 (SEND 2) output level

MUTE — Mutes AUX MIX 2 (SEND 2)

Level Control (Outer) — Adjusts stereo AUX MIX 1 (SEND 1) left channel level

Level Control (Inner) — Adjusts stereo AUX MIX 1 (SEND 1) right channel level

MUTE — Mutes stereo AUX MIX 1 (SEND 1)

ST.B (Stereo B) — Adjusts Mix B level when SEP is selected

SEP (Separate) — Directs stereo Mix A through ST. B control to create the independently adjustable Mix B

Writing Strip

REH (Rehearse) — Selects REHEARSE mode

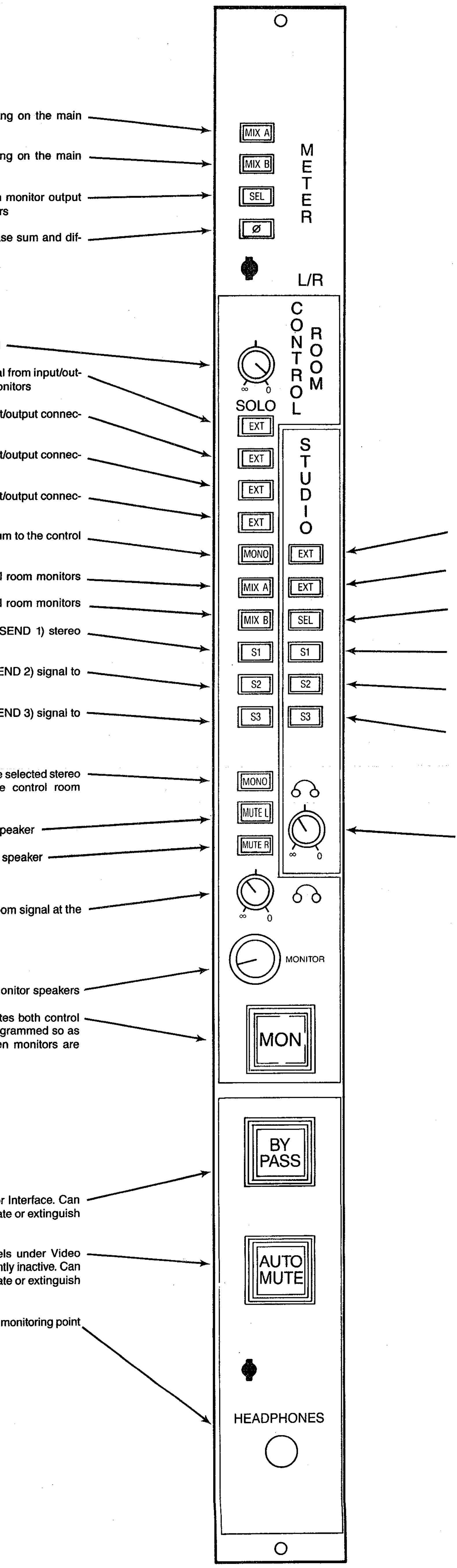
ON AIR — Is used alone to enable ON AIR mode, or with CLR to cancel ON AIR mode

CLR (Clear) — Is used alone to cancel REHEARSE mode, or with ON AIR switch to cancel ON AIR mode

Master Fader — Adjusts the stereo (Mix A) output level

DYNAMIC — Assigns output to one of four Dynamics module processors. Indicates selected processor number or L for LOCAL (unassigned) mode

Figure 3-1. Master Module



MIX A — Selects Mix A for monitoring on the main L/R meters

Mix B — Selects Mix B for monitoring on the main L/R meters

SEL (Select) — Selects control room monitor output for monitoring on the main L/R meters

ø — Assigns main L/R meters to phase sum and difference monitoring

SOLO — Sets the SOLO signal level

EXT (External) — Directs EXT 1 signal from input/output connector to the control room monitors

EXT — Directs EXT 2 signal from input/output connector to the control room monitors

EXT — Directs EXT 3 signal from input/output connector to the control room monitors

EXT — Directs EXT 4 signal from input/output connector to the control room monitors

MONO — Directs the MIX A MONO sum to the control room monitors

MIX A — Directs MIX A to the control room monitors

MIX B — Directs MIX B to the control room monitors

S1 (Send 1) — Directs AUX MIX 1 (SEND 1) stereo signal to the control room monitors

S2 (Send 2) — Directs AUX MIX 2 (SEND 2) signal to the control room monitors

S3 (Send 3) — Directs AUX MIX 3 (SEND 3) signal to the control room monitors

MONO — Creates MONO sum from the selected stereo signals before directing them to the control room monitors

MUTE L — Mutes control room left speaker

MUTE R — Mutes control room right speaker

🎧 — Adjusts level of the control room signal at the stereo HEADPHONES jack

MONITOR — Adjusts volume at the monitor speakers

MON (Monitor Mute) — Mutes/unmutes both control room and studio monitors. Can be programmed so as to either illuminate or extinguish when monitors are muted

BYPASS — Bypasses the Video Editor Interface. Can be programmed so as to either illuminate or extinguish when BYPASS is selected

AUTO MUTE — Mutes those channels under Video Editor Interface control which are currently inactive. Can be programmed so as to either illuminate or extinguish when AUTO MUTE is selected

HEADPHONES — Provide headphone monitoring point for control room audio

EXT (External) — Directs EXT 1 signal from input/output connector to the studio monitors

EXT — Directs EXT 2 signal from input/output connector to the studio monitors

SEL (Select) — Directs the selected control room monitor source to the studio monitors

S1 (Send 1) — Directs AUX MIX 1 (SEND 1) stereo signal to the studio monitors

S2 (Send 2) — Directs AUX MIX 2 (SEND 2) signal to the studio monitors

S3 (Send 3) — Directs AUX MIX 3 (SEND 3) signal to the studio monitors

🎧 — Adjusts level of the studio monitor signal at the studio headphones connection points on the input/output connector

igure 3-2. Monitor Module

Selection switches. It should not be confused with the MONO switch previously listed in paragraph 3.5.2.2.

There also are three muting switches in the CONTROL ROOM group, these being labelled MUTE L, MUTE R and MON. The MUTE L and MUTE R switches are used to individually mute the left or right Control Room speakers, the appropriate speaker becoming muted when the switch is pressed. The large MON switch is used to mute/unmute either or both of the Control Room and Studio Monitors. This switch has a built-in indicator which can be programmed so as to either illuminate or extinguish when the Monitors are muted. (See Section 2, paragraph 2.5.4.1 for programming details.)

3.5.3 STUDIO

The STUDIO section contains six Signal Selection switches and one level control. The two EXT switches are used to direct external signals EXT 1 or EXT 2 from the Monitor module input/output connector to the Studio Monitor (see Section 2, Figure 2-5, Sheet 1). Similarly, the switches labelled S1, S2 and S3 direct SEND 1, SEND 2 or SEND 3 signals to the Monitor.

The SEL switch directs the signal selected by the Control Room Signal Select switches to the Studio Monitor. (See paragraph 3.5.2.2.)

The level control (⌒) adjusts the level of the Studio Monitor signals supplied to pins 2, 3, 31 and 32 on the Monitor module input/output connector, these signals being used for both sets of external studio headphone connections.

3.5.4 Other Controls

The remaining controls on the Monitor module are the BYPASS and AUTO MUTE switch/indicators. Both of these controls are associated with the optional Editor Interface, MXBK-EI21.

The BYPASS switch is used to completely bypass the Editor Interface. The built-in indicator can be programmed so as to either illuminate or extinguish when BYPASS is selected. (See Section 2, paragraph 2.5.4.3 for programming details.)

AUTOMUTE is used to automatically mute those Editor Interface channels which are not currently under Editor control. The indicator can be programmed so as to either illuminate or extinguish when the AUTOMUTE function is selected. (See Section 2, paragraph 2.5.4.2 for programming details.)

3.6 COMMUNICATIONS MODULE

The mandatory Communications module (Figure 3-3) provides Talkback facilities between the console and the studio or such other destinations as may be desired by the user. The module also includes a SLATE oscillator for generating Take markers, together with pink and white noise generators and a Test oscillator, these being used for test and calibration purposes.

3.6.1 OSCILLATOR

The OSCILLATOR section contains seven pushbutton switches, together with the FREQ and OSC LEVEL controls. Of the seven switches, ON is used to activate/de-activate the Oscillator section, and the remainder are used to select function and frequency. The six function/frequency switches are mutually exclusive, thus precluding simultaneous selection of, say, PINK and WHITE noise or x10 and x100 frequency multiplication.

The functions of the PINK and WHITE noise selection switches and the x1, x10 and x100 frequency multiplier switches are self-evident. The IDNT (Identification) switch generates a two-tone "warble" signal which is particularly useful for line identification when setting up outside broadcasts. The IDNT signal alternates between 1 kHz and 2kHz at a rate of about 0.5 Hz.

The FREQ control is used to set the basic Oscillator frequency, this being adjustable between 15 Hz and 150 Hz, with a detent to mark the 1kHz position.. Thus, with appropriate frequency multiplier selection, the total available frequency range is from 15 Hz to 15 kHz.

The OSC LEVEL control is used to adjust the level of the selected Oscillator function, and has a control range from full suppression to +12 dB, the 0 dB point or chosen level being marked by a detent position on the control.

3.6.2 ASSIGNMENT

The ASSIGNMENT section switches are used to direct the selected Oscillator signal to the various buses. Each switch is labelled with its appropriate destination, these being GPS (Groups), MIX, S1, S2 and S3 (SENDS 1, 2 and 3). The ASSIGNMENT switches may be selected individually or simultaneously in any desired combination.

3.6.3 TALKBACK SELECT

The TALKBACK SELECT group incorporates ten momentary contact switches which are used to direct the Talkback audio to various destinations, five of these destinations being user-definable. These switches can be selected individually or simultaneously in any combination, and must be held for as long as it is desired to transmit communications signals.

The five EXT signals are used to select user-defined destinations, the connections to these destinations being made via pins 12 through 16 and 41 through 45 on the Communications module input/output connector at the rear of the console. (See Section 2, Figure 2-5, Sheet 1.)

The SLATE switch directs the Talkback audio to the four GROUP buses and the MIX L and MIX R buses. AUX S1, AUX S2 and AUX S3 direct the signal to the SEND 1,2 and 3 buses, and the STUDIO switch directs Talkback audio to the Studio Monitor

3.6.4 Other Controls

The only other control on the Communications module is the TB/PFL LEVEL (Talkback/Pre-Fader Listening level) control. This is used to adjust the Talkback, Pre-Select Listening, and Pre-Fader Listening audio levels, the control range being from full suppression to maximum.

3.7 INPUT/OUTPUT MODULE

The Input/Output module (Figure 3-4), commonly called the I/O module, contains all of the signal steering circuits and level controls that may be required for audio signal processing. The outputs available from the I/O module are mono line, paired stereo, and three AUX MIX (SEND) outputs (one stereo and 2 mono). Pre-Fader or post-Fader signals are selectable, and these can be directed to the 2-MIX bus, to any or all of the SEND buses, to any one of four Group modules, or to the Dynamics module for further processing. Signals can be directed to the PFL bus by means of the PFL (Pre-Fader Listening) switch or the PSL (Pre-Selected Listening) switch.

3.7.1 INPUT/DIRECT LINE OUT Selection

The INPUT/DIRECT LINE OUT Selection section contains selector switches and level controls for the two input signals and one of the four DIRECT LINE OUT signals. As well as these, the section includes five other switches which are used to control various functions associated with the INPUT and DIRECT LINE OUT signals.

3.7.1.1 INPUT 1/INPUT 2 Selection Controls

Figure 3-4 illustrates the standard I/O module incorporating one Microphone Input card and one Line Input card. In this configuration, the cards are arranged so that INPUT 1 is Microphone and INPUT 2 is Line, and the input selection switches are labelled accordingly.

For the other possible configurations, i.e. two Microphone Inputs or two Line inputs, both switches are labelled according to configuration. In all cases, the switch arrangement is such that the upper switch always selects INPUT 1 and the lower switch always selects INPUT 2.

The input selection switches both have associated Input Level Trim controls, the control applicable to each switch being indicated on the panel by means of an interconnecting line. These controls are used to set the levels for both inputs.

In addition to the selection switches and level controls, two other switches, PHAN (Phantom Power) and PAD are associated with the Microphone Input cards. PHAN, when selected, switches on the Phantom Power (+48 V) required for capacitive microphones. The associated Phantom Power Indicator becomes illuminated when PHAN is selected. When the PAD switch is selected, a fixed 20 dB attenuator is switched into the Microphone Input circuit. It should be noted that the PHAN and PAD switches have no connections to the Line Input cards.

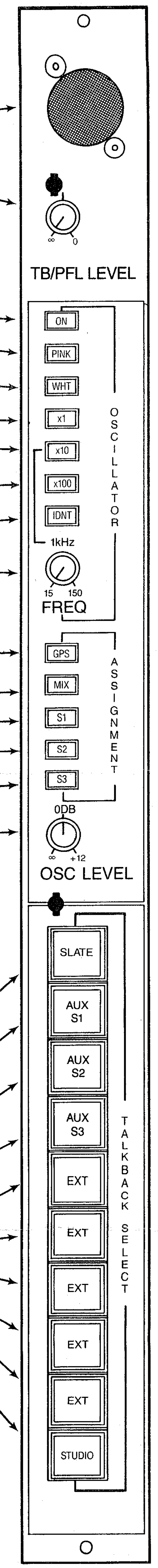
Two other switches affecting the INPUT 1 and INPUT 2 signals are Ø (Phase) and PSL (Pre-Select Listening). Ø is used to invert the phase of the input signal (either Line or Microphone). PSL is used to direct the non-selected signal to the PFL (Pre-Fader Listening) bus. For instance, if INPUT 1 (MIC) is selected, the INPUT 2 signal is placed on the PFL bus when PSL is pressed and held.

3.7.1.2 DIRECT LINE OUT Controls

The remaining switches in the section are applicable to DIRECT LINE OUT operations. The DIRECT LINE OUT signal is available at pins 9 (Output High), 38 (Output Low) and 8 and 37 (Shield) on the I/O module input/output connector at the rear of the console. (See Section 2, Figure 2-5, Sheet 2.)

The signals available for DIRECT LINE OUTPUT are: INPUT 1 (selected with MIC), INPUT 2 (selected with LINE), Equalizer output (selected with EQ), and the I/O Channel signal (selected with CHAN). The level of the selected signal is adjusted by means of the Output Level Trim control, this being located just to the left of the LINE and EQ switches.

The remaining switch in the section (SOLO) is used to direct the selected DIRECT LINE OUT signal to the SOLO bus.



Talkback Microphone

TB/PFL LEVEL (Talkback/Pre-Fader Listening) — Sets signal level for Talkback and PFL audio

ON — Sets test Oscillator ON.

PINK — Selects PINK noise. Automatically disables WHITE noise generator and IDNT tone

WHITE — Selects WHITE noise. Automatically disables PINK noise generator and IDNT tone

x1 — Sets Oscillator output to selected base frequency

x10 — Sets Oscillator frequency to ten times the selected base frequency

x100 — Sets Oscillator frequency to one hundred times the selected base frequency

IDNT (Identification) — Generates a two-tone signal for line identification in outside broadcast applications

FREQ (Frequency) — Sets the base frequency for the Oscillator

Except for ON, all OSCILLATOR control switches are mechanically arranged so as to be mutually exclusive, i.e. two frequency multipliers cannot be selected simultaneously, etc.

GPS (GROUPS) — Directs the Oscillator signal to the GROUP buses

MIX — Directs the Oscillator signal to the MIX buses

S1 (SEND 1) — Directs the Oscillator signal to the SEND 1/AUX MIX 1 bus

S2 — Directs the Oscillator signal to the SEND 2/AUX MIX 2 bus

S3 — Directs the Oscillator signal to the SEND 3/AUX MIX 3 bus

OSC LEVEL — Adjusts the Oscillator signal amplitude

Test signal ASSIGNMENT switches may be selected individually or simultaneously in any desired combination

SLATE — Directs the Talkback audio to the four GROUP buses and the MIX L and R buses

AUX S1 — Directs the Talkback audio to the SEND 1/AUX MIX 1 bus

AUX S2 — Directs the Talkback audio to the SEND 2/AUX MIX 2 bus

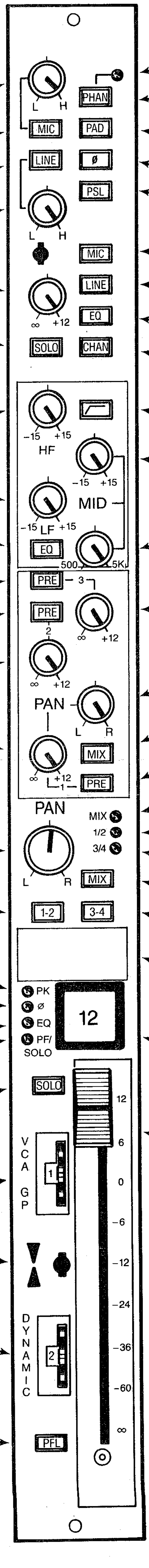
AUX S3 — Directs the Talkback audio to the SEND 3/AUX MIX 3 bus

EXT (External) — Five lines available to direct talkback audio to user-defined external destinations

STUDIO — Directs Talkback audio to the STUDIO Monitor

TALKBACK SELECT switches are momentary contact types and must be held down for as long as it is desired to send signals. They may be selected individually or simultaneously in any desired combination

Figure 3-3. Communications Module



Input Level Trim — Sets INPUT 1 signal level

MIC (INPUT 1 Selector) — Selects INPUT 1 (Mic or Line)

LINE (INPUT 2 Selector) — Selects INPUT 2 (Mic or Line)

Input Level Trim — Sets INPUT 2 signal level

Output Level Trim — Sets DIRECT LINE OUT signal level

SOLO — Selects DIRECT LINE OUT signal for SOLO listening

HF (High Frequency Boost/Cut) — Sets High Frequency Equalization

LF (Low Frequency Boost/Cut) — Sets Low Frequency Equalization

EQ (Equalizer Selector) — Activates Equalizer

PRE (Pre-fader) — Directs Pre-fader Audio to AUX MIX 3 (SEND 3) bus

PRE (Pre-fader) — Directs Pre-fader Audio to AUX MIX 2 (SEND 2) bus

Send 2 Level — Sets signal level on AUX MIX 2 (SEND 2) bus

Send 1 Level — Sets signal level on stereo AUX MIX 1 (SEND 1) bus

PAN (Channel Pan) — Adjusts Channel Output Panning

1-2 (Groups 1-2) — Directs Channel Output to Audio Groups 1 and 2

PK (Peak Indicator) — Illuminates to show that Channel audio is approaching max permissible level

Ø (Phase) — Illuminates to show that the phase of the input signal is inverted

EQ — Illuminates when Equalizer is active

PF/SOLO — Illuminates when either PFL (Pre-Fader Listening) or SOLO is selected

SOLO — Sets Channel into SOLO mode

VCA GP (VCA Group) — Assigns Channel VCA control to one of four Groups. Indicates Group number or L for LOCAL (unassigned) mode

Direction Indicators — Show the next direction of fade when under Editor Interface control

DYNAMIC (Dynamic Processor Selector) — Assigns Channel output to one of four Dynamics Module processors. Indicates selected processor number or L for LOCAL (unassigned) mode

PFL (Pre-Fader Listening) — Momentary contact: directs Channel output to the PFL bus

Phantom Power Indicator — Illuminates to show that Phantom Power is selected

PHAN (Phantom Power) — Turns on 48 V microphone power. Is effective only when Microphone Input card is installed

PAD — Activates 20 dB input attenuator. Is effective only when Microphone Input card is installed

Ø (Phase) — Inverts the phase of the input signal

PSL (Pre-Select Listening) — Directs the non-selected input (INPUT 1 or INPUT 2) to the PFL bus

MIC (INPUT 1 Selector) — Selects INPUT 1 as the source for DIRECT LINE OUT

LINE (INPUT 2 Selector) — Selects INPUT 2 as the source for DIRECT LINE OUT

EQ (Equalizer) — Selects Equalizer output as the source for DIRECT LINE OUT

CHAN (Channel) — Selects the Channel output as the source for DIRECT LINE OUT

/‾‾ (High Pass Filter) — Activates the High Pass Filter

MID (Mid Frequency Boost/Cut) — Sets Mid Frequency Equalization

Mid Frequency Sweep — Sets the desired Equalizer Mid Frequency

Send 3 Level — Sets signal level on AUX MIX 3 (SEND 3) bus

PAN (Send 1 Pan) — Adjusts AUX MIX 1 (SEND 1) Panning

MIX — Directs Stereo Mix A to AUX MIX 1 (SEND 1) bus

PRE (Pre-fader) — Directs the Channel pre-fader output to AUX MIX 1 (SEND 1) rotary fader

MIX — Illuminates when Channel output is directed to the stereo MIX bus

1/2 (Groups 1/2) — Illuminates when Channel output is directed to Audio Groups 1 and 2

3/4 (Groups 3/4) — Illuminates when Channel output is directed to Audio Groups 3 and 4

MIX — Directs Channel output to the stereo MIX bus

3-4 (Groups 3-4) — Directs Channel Output to Audio Groups 3 and 4

Writing Strip

Channel Mute — Mutes/Unmutes Channel. Can be programmed so as to either illuminate or extinguish when Channel is muted

Fader — Controls the VCA output level

igure 3-4. Input/Output Module

3.7.2 Equalizer

The Equalizer group contains two switches, three boost/cut controls, and one frequency control. Of the two switches, EQ (Equalizer) activates the Equalizer, and /‾ (High Pass Filter) activates the High Pass Filter. The High Pass filter can be selected independently, and has a cutoff frequency of 80 Hz (at −3 dB), with a rolloff characteristic of 12 dB per octave.

The three boost/cut controls, HF (High Frequency), MID (Mid Frequency) and LF (Low Frequency) are used to adjust the boost/cut in the appropriate sections of the band, and the Mid Frequency Sweep control sets the Equalizer Mid Frequency between the limits 500 Hz to 5 kHz.

3.7.3 SEND Controls

The SEND control section has three PRE switches and three level controls, each switch/control pair being associated with one SEND. This section also has a MIX switch and a PAN control, these being applicable only to SEND 1.

Each of the PRE switches is used to direct Pre-Fader audio to the appropriate SEND bus, and each associated level control sets the signal amplitude. The switch/control pairs and their applicable SENDs are clearly indicated by the markings on the panel. (See Figure 3-4.)

The PAN control and MIX switch are associated with stereo SEND 1. PAN adjusts SEND 1 PRE panning, and MIX directs the post-Fader/post-PAN signals to the SEND 1 bus. It should be noted that, when MIX is selected, the level and PAN controls for the SEND are no longer effective, and signal panning and level are adjusted by the Channel PAN control and the Fader. It should be further noted that where MIX and SEND 1 PRE are pressed simultaneously, the post-Fader/post PAN signals override the PRE signal and the PAN and level controls.

3.7.4 Channel Outputs

The Channel Output section provides signal-steering switches, their associated indicators, and a PAN control, all of which are applicable to the Channel output.

The MIX, 1-2, and 3-4 switches are used to direct the output to the MIX bus, GROUP 1 and 2 buses, or GROUP 3 and 4 buses, respectively. When these switches are selected, the appropriate indicators, MIX, 1/2 and 3/4 become illuminated. It is important to note that, where Channel signals are directed to the GROUP buses, the odd-numbered bus (GROUP 1 or Group 3) carries the left channel and the even-numbered bus (GROUP 2 or GROUP 4) carries the right channel. The PAN controls adjusts the panning between the left and right output channels.

3.7.5 Other Controls and Indicators

The remaining controls on the I/O module include four LED indicators, the Channel Mute switch, SOLO, VCA GP, DYNAMIC and PFL switches and the Fader.

Three of the four LED indicators, Ø (Phase), EQ, and PFL/SOLO become illuminated when their associated switches have been selected, as described in Figure 3-4. The PK (Peak) indicator becomes illuminated to show that the program material is peaking at +8dB.

It is important to note that, during normal operation, optimum signal to noise ratio is obtained when the Input Level Trim control is set so that the PK indicator briefly flashes on only as peaks occur in the program material. If the PK indicator becomes illuminated too frequently, the input level should be reduced.

The Channel Mute switch is used to mute or unmute the Channel, and its built-in indicator can be programmed so as to either illuminate or extinguish when the channel is muted. For Channel Mute indicator programming details, see Section 2, paragraph 2.5.1.2.

SOLO is used to direct the Channel output to the SOLO bus, setting the Channel into SOLO mode. Similarly, PFL (Pre-Fader Listening) is used to direct the Channel output to the PFL bus. It should be noted that PFL is a momentary contact switch, and must be held for as long as Pre-Fader Listening is desired.

The VCA GP (VCA Group) switch assigns control of the Channel's VCA (Voltage-Controlled Amplifier) to one of the four optional Group modules, the selected Group module (1, 2, 3 or 4) being identified in the display window immediately to the left of the thumbwheel switch. When control is assigned in this manner, the Channel output level is controlled by the Fader on the selected Group module, as well as the I/O module Fader. For Local operation (no Group module assigned), the character L is displayed in the window, and control is restored to the I/O module Fader exclusively.

Where the Channel output is to be subjected to dynamic processing, the DYNAMIC switch directs the signal to one of four processors in the optional Dynamics module. The selected processor is identified in the display window. If the output is not to be processed, the DYNAMIC switch should be set to L (Local).

3.8 STEREO INPUT MODULE

The Stereo Input module (Figure 3-5) is a specialized version of the Input/Output module, and differs in that it accepts line inputs only. Except for Input selection, DIRECT LINE OUT selection and EQ selection, most of the controls and indicators on this module are similar to those on the I/O module

3.8.1 Input and DIRECT LINE OUTPUT Selection

The Input and DIRECT LINE OUT selection controls differ widely from those on the I/O module. Input selection offers a choice of three stereo inputs, and provision is made for reversing left and right channels or directing either channel into both left and right channel paths. Also, the optional signals available for DIRECT LINE OUT differ from those in the I/O module.

3.8.1.1 Input Selection

In the Stereo Input module, provision is made for selecting between three stereo inputs, these being designated IP 1 (INPUT 1), IP 2 (INPUT 2), and IP 3 (INPUT 3). The Input Level Trim control adjusts the level of the selected input.

The MONO L and MONO R switches can be operated simultaneously or separately, depending upon the results desired. When MONO L is selected alone, the left channel of the stereo signal is directed to both left and right channel paths, and the right channel input signal is suppressed. Similarly, when MONO R is selected alone, the right channel of the stereo signal is directed to both left and right channel paths, and the left channel input signal is suppressed.

When MONO L and MONO R are selected simultaneously, the left and right stereo channels are reversed, i.e. the left channel input signal is directed to the right channel path, and vice versa.

The Ø (Phase) switch, when selected, performs a function similar to that of the Ø switch on the I/O module, but reverses ONLY the left channel of the stereo input signal.

3.8.1.2 DIRECT LINE OUT Selection

Four stereo signals are available at the DIRECT LINE OUT connectors, these being: INPUT 1 (selected with IP 1), INPUT 2 (selected with IP 2), INPUT 3 (selected with IP 3), and the Channel signal (selected with CHAN). The Output Level Trim control sets the amplitude of the selected DIRECT LINE OUT signal, and the SOLO switch directs the selected signal to the SOLO bus

The DIRECT LINE OUT signals are available at pins 6, 20 and 35 (left channel) and pins 5, 19 and 34 (right channel) on the Stereo Input module input/output connector at the rear of the console. (See Section 2, Figure 2-5, Sheet 2.)

3.8.2 Equalizer

The Equalizer controls are similar to those described in paragraph 3.7.2 for the I/O module, the major difference being that the High Pass Filter switch is replaced with a second EQ switch.

Since this is a stereo module, the HF, LF, MID and Mid Frequency Sweep controls are applicable to both left and right channels when both EQ switches are selected. If it is desired to apply equalization to the left channel only, the EQL switch to the left of the Mid Frequency Sweep control is selected. Similarly, if equalization is to be applied to the right channel only, the EQR switch to the right of the HF control is selected.

3.8.3 SEND Controls

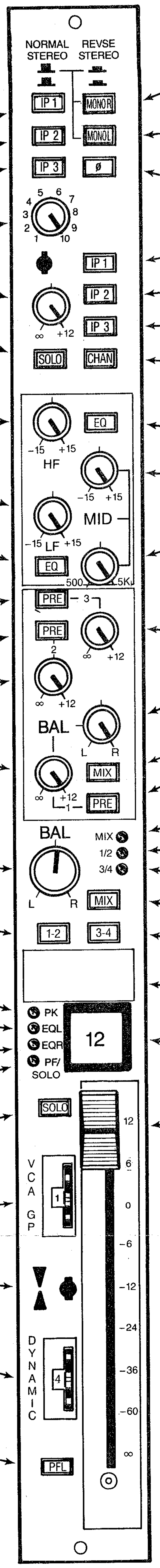
The SEND controls are similar to those described in paragraph 3.7.3 for the I/O module, differing only in that the PAN control is replaced by a BAL (Balance) control.

As in the I/O module, each PRE switch is used to direct Pre-Fader audio to the appropriate SEND level control which adjusts the amplitude of the signal. However, it must be noted that, since SEND 2 and SEND 3 are mono sends, they will receive the mono sum of the stereo signal. The function of the MIX switch remains identical to that in the I/O module, bypassing the PRE switch, AUX 1 level control, and AUX 1 BAL.

As already stated, the PAN control in the I/O module is replaced by a BAL control in the Stereo Input module. The difference between between PAN and BAL is that the BAL control usually has a limited range compared to PAN.

3.8.4 Channel Outputs

The Channel output controls in the Stereo Input module exactly duplicate those described in paragraph 3.7.4 for the I/O module, except that the PAN control is replaced by a BAL control.



IP 1 (Input 1) — Selects INPUT 1 signal

IP 2 — Selects INPUT 2 signal

IP 3 — Selects INPUT 3 signal

Input Level Trim — Sets selected input signal level

Output Level Trim — Sets DIRECT LINE OUT signal level

SOLO — Selects DIRECT LINE OUT signal for SOLO listening

HF (High Frequency Boost/Cut) — Sets High Frequency Equalization

LF (Low Frequency Boost/Cut) — Sets Low Frequency Equalization

EQ (Equalizer Selector) — Activates the left channel Equalizer

PRE (Pre-fader) — Directs Pre-fader Audio to AUX MIX 3 (SEND 3) bus

PRE (Pre-fader) — Directs Pre-fader Audio to AUX MIX 2 (SEND 2) bus

Send 2 Level — Sets signal level on AUX MIX 2 (SEND 2) bus

Send 1 Level — Sets signal level on AUX MIX 1 (SEND 1) bus

BAL (Channel Balance) — Adjusts Channel left and right balance

1-2 (Groups 1-2) — Directs Channel Output to Audio Groups 1 and 2

PK (Peak Indicator) — Illuminates to show that Channel audio is approaching max permissible level

EQL (Equalizer Left) — Illuminates to show that left channel equalization is in effect

EQR (Equalizer Right) — Illuminates to show that right channel equalization is in effect

PF/SOLO Illuminates when either PFL (Pre-Fader Listening) or SOLO is selected

SOLO — Sets Channel into SOLO mode

VC GP (VCA Group) — Assigns Channel VCA control to one of four Groups. Indicates Group number or L for LOCAL (unassigned) mode

Direction Indicators — Show the next direction of fade when under Editor Interface control

DYNAMIC (Dynamic Processor Selector) — Assigns Channel output to one of four Dynamics Module processors. Indicates selected processor number or L for LOCAL (unassigned) mode

PFL (Pre-Fader Listening) — Momentary contact: directs Channel output to the PFL bus

MONO R — When selected together with MONO L, switches right channel to left and left channel to right. When selected alone, directs right channel audio into both left and right channels.

MONO L — When selected together with MONO R, switches left channel to right and right channel to left. When selected alone, directs left channel audio into both left and right channels.

ø(Phase) — Inverts the phase of the left channel signal

IP 1 (INPUT 1) — Selects INPUT 1 as the source for DIRECT LINE OUT

IP 2 (INPUT 2) — Selects INPUT 2 as the source for DIRECT LINE OUT

IP 3 (INPUT 3) — Selects INPUT 3 as the source for DIRECT LINE OUT

CHAN (CHANNEL) — Selects the Channel output as the source for DIRECT LINE OUT

EQ (Equalizer Selector) — Activates the right channel Equalizer

MID (Mid Frequency Boost/Cut) — Sets Mid Frequency Equalization

Mid Frequency Sweep — Sets the desired Equalizer Mid Frequency

Send 3 Level — Sets signal level on AUX MIX 3 (SEND 3) bus

BAL (Send 1 Balance) — Adjusts AUX MIX 1 (SEND 1) left and right balance

MIX — Directs Stereo Mix A to AUX MIX 1 bus

PRE (Pre-fader) — Directs the Channel Pre-fader signal to AUX MIX 1 rotary fader

MIX — Illuminates when Channel output is directed to the stereo MIX bus

1/2 (Groups 1/2) — Illuminates when Channel output is directed to Audio Groups 1 and 2

3/4 (Groups 3/4) — Illuminates when Channel output is directed to Audio Groups 3 and 4

MIX — Directs Channel output to the stereo MIX bus

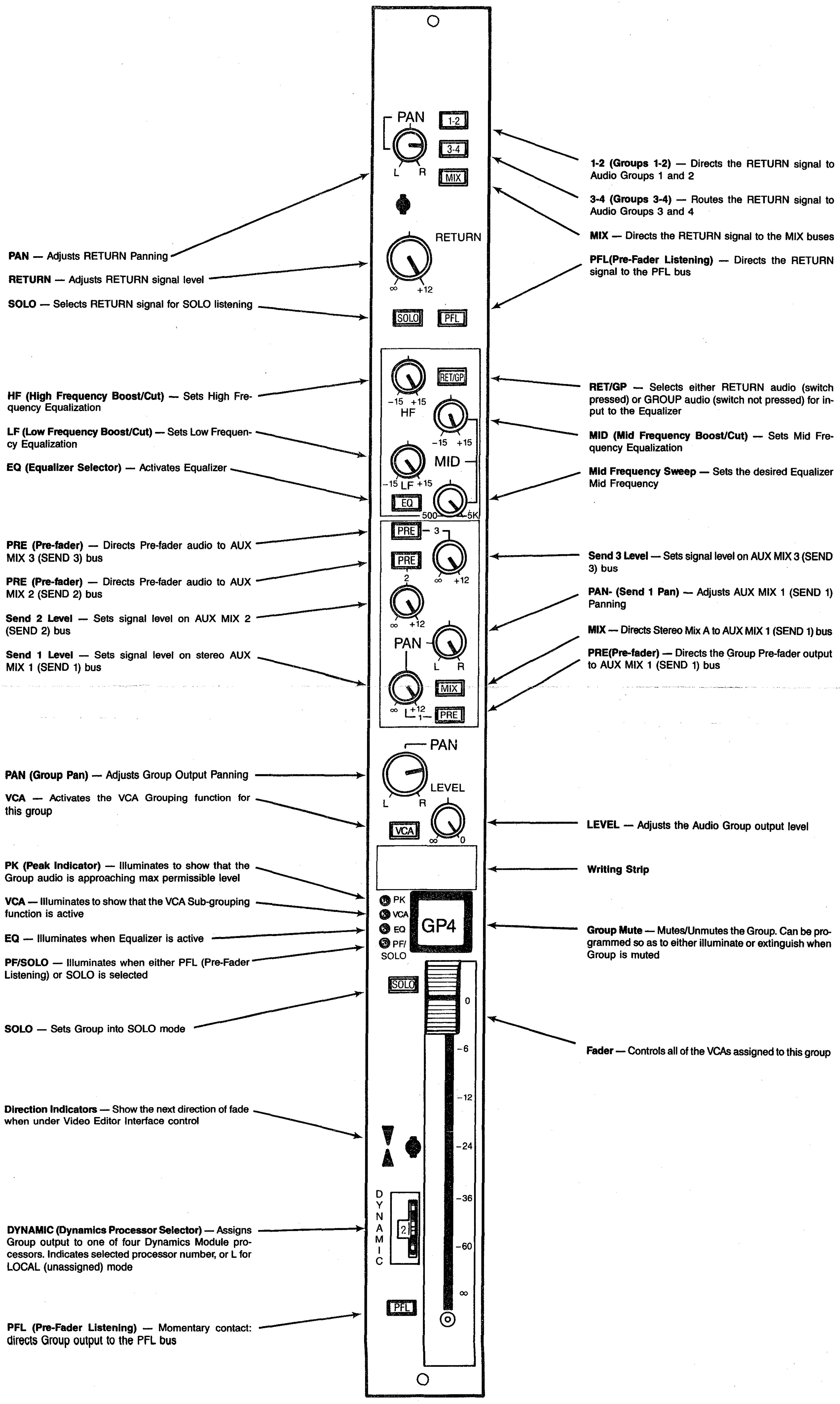
3-4 (Groups 3-4) — Directs Channel Output to Audio Groups 3 and 4

Writing Strip

Channel Mute — Mutes/Unmutes Channel. Can be programmed so as to either illuminate or extinguish when Channel is muted

Fader — Controls the VCA output level

Figure 3-5. Stereo Input Module



PAN — Adjusts RETURN Panning

RETURN — Adjusts RETURN signal level

SOLO — Selects RETURN signal for SOLO listening

HF (High Frequency Boost/Cut) — Sets High Frequency Equalization

LF (Low Frequency Boost/Cut) — Sets Low Frequency Equalization

EQ (Equalizer Selector) — Activates Equalizer

PRE (Pre-fader) — Directs Pre-fader audio to AUX MIX 3 (SEND 3) bus

PRE (Pre-fader) — Directs Pre-fader audio to AUX MIX 2 (SEND 2) bus

Send 2 Level — Sets signal level on AUX MIX 2 (SEND 2) bus

Send 1 Level — Sets signal level on stereo AUX MIX 1 (SEND 1) bus

PAN (Group Pan) — Adjusts Group Output Panning

VCA — Activates the VCA Grouping function for this group

PK (Peak Indicator) — Illuminates to show that the Group audio is approaching max permissible level

VCA — Illuminates to show that the VCA Sub-grouping function is active

EQ — Illuminates when Equalizer is active

PF/SOLO — Illuminates when either PFL (Pre-Fader Listening) or SOLO is selected

SOLO — Sets Group into SOLO mode

Direction Indicators — Show the next direction of fade when under Video Editor Interface control

DYNAMIC (Dynamics Processor Selector) — Assigns Group output to one of four Dynamics Module processors. Indicates selected processor number, or L for LOCAL (unassigned) mode

PFL (Pre-Fader Listening) — Momentary contact: directs Group output to the PFL bus

1-2 (Groups 1-2) — Directs the RETURN signal to Audio Groups 1 and 2

3-4 (Groups 3-4) — Routes the RETURN signal to Audio Groups 3 and 4

MIX — Directs the RETURN signal to the MIX buses

PFL(Pre-Fader Listening) — Directs the RETURN signal to the PFL bus

RET/GP — Selects either RETURN audio (switch pressed) or GROUP audio (switch not pressed) for input to the Equalizer

MID (Mid Frequency Boost/Cut) — Sets Mid Frequency Equalization

Mid Frequency Sweep — Sets the desired Equalizer Mid Frequency

Send 3 Level — Sets signal level on AUX MIX 3 (SEND 3) bus

PAN- (Send 1 Pan) — Adjusts AUX MIX 1 (SEND 1) Panning

MIX — Directs Stereo Mix A to AUX MIX 1 (SEND 1) bus

PRE(Pre-fader) — Directs the Group Pre-fader output to AUX MIX 1 (SEND 1) bus

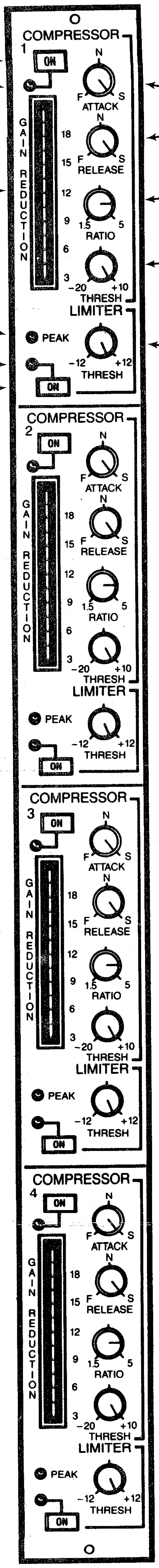
LEVEL — Adjusts the Audio Group output level

Writing Strip

Group Mute — Mutes/Unmutes the Group. Can be programmed so as to either illuminate or extinguish when Group is muted

Fader — Controls all of the VCAs assigned to this group

gure 3-6. Group Module


COMPRESSOR
1
ON
N
F
S
ATTACK
RELEASE
1.5
5
RATIO
-20
+10
THRESH
LIMITER
PEAK
-12
+12
THRESH
ON
GAIN REDUCTION
18
15
12
9
6
3
COMPRESSOR
2
COMPRESSOR
3
COMPRESSOR
4

ON — Sets Compressor to ON

Compressor ON Indicator — Illuminates to show that Compressor is selected

GAIN REDUCTION — Indicates the degree of input signal to output signal attenuation. Meter calibration is in dB

PEAK — Illuminates to show that Processor audio is approaching max permissible level

Limiter ON Indicator — Illuminates to show that Limiter is selected

ON — Sets Limiter to ON

ATTACK — Adjusts Compressor ATTACK time

RELEASE — Adjusts Compressor RELEASE time

RATIO — Sets the compression ratio, i.e. the ratio of gain reduction vs signal level increase

THRESH — Compressor Threshold: Sets the level above which compressor gain reduction begins

THRESH — Limiter Threshold: Sets the level above which limiter gain reduction begins

Figure 3-7. Dynamics Module

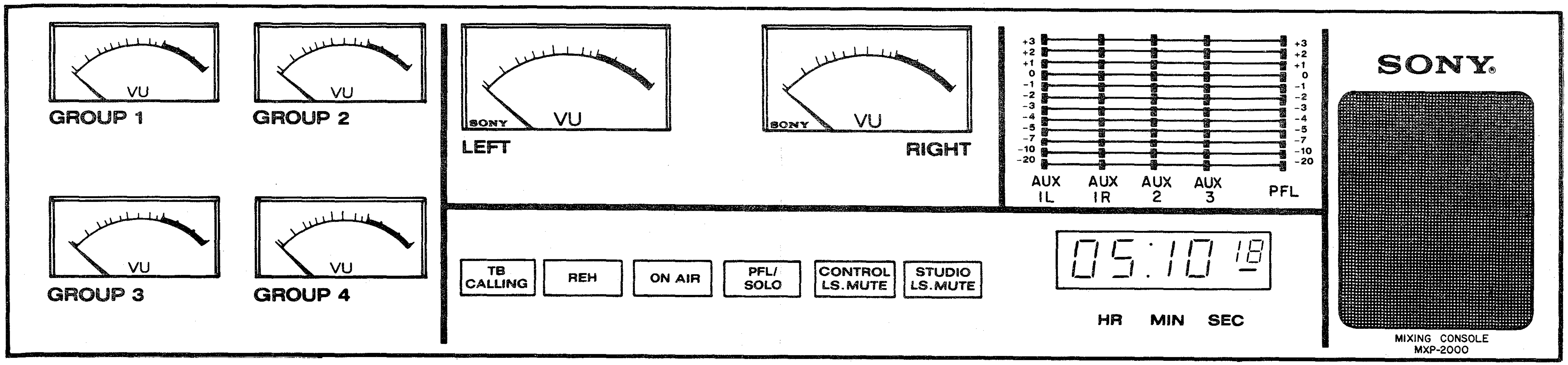

VU
GROUP 1
VU
GROUP 2
SONY
VU
LEFT
SONY
VU
RIGHT
+3
+2
+1
0
-1
-2
-3
-4
-5
-7
-10
-20
AUX 1L
AUX 1R
AUX 2
AUX 3
PFL
SONY
VU
GROUP 3
VU
GROUP 4
TB CALLING
REH
ON AIR
PFL/ SOLO
CONTROL LS.MUTE
STUDIO LS.MUTE
05:10 18
HR
MIN
SEC
MIXING CONSOLE
MXP-2000

Figure 3-8. Meter Housing

3.8.5 Other Controls and Indicators

With the exception of two of the LED indicators, the remaining controls are identical to those described in paragraph 3.7.5 for the I/O module.

The Ø (phase) and EQ indicators are replaced by the EQL (Left Equalizer) and EQR (Right Equalizer) indicators, these becoming illuminated when the appropriate Equalizers are activated.

It should be noted that the Channel Mute indicator programming differs from that described for the I/O module. Programming information for the Stereo Input module Channel Mute indicator is given in Section 2, paragraph 2.5.5.4.

3.9 GROUP MODULE

The optional Group module (Figure 3-6) provides both audio and VCA grouping functions. The standardized console system incorporates four Group modules, these being of fixed configuration (assigned by internal jumper arrangement) and having no optional plug-in cards.

The signal processing and steering functions for the Group audio are similar to those provided by the I/O module for INPUT 1 and INPUT 2. In addition, steering and level controls for the RETURN audio also are located on the Group module, but it should be noted that this circuitry is not related to the Grouping functions.

3.9.1 RETURN Controls

The RETURN signal on pins 12 (high) and 41 (low) of the Group module's input/output connector can be derived from a SEND through some external processing unit, or it can be a completely independent input. The steering switches 1-2, 3-4 and MIX provide a means of directing the RETURN signal to GROUP buses 1(L)/2(R), 3(L)/4(R), or to the 2-MIX bus. The PAN control pans the signal, and RETURN adjusts the level. SOLO and PFL are used to direct the signal to the SOLO or PFL buses.

3.9.2 Equalizer

With the exception of RET/GP, which replaces the High Pass Filter switch, the Equalizer controls are exactly the same as those described in paragraph 3.7.2 for the I/O module. RET/GP (Return/Group) is used to switch the Equalizer into the Group audio path (switch pressed) or into the RETURN audio path (switch not pressed).

3.9.3 SENDS Controls

The SENDS controls for the Group module perform exactly the same functions as those described in paragraph 3.7.3 for the I/O module.

3.9.4 GROUP Output Controls

The Group output controls comprise PAN and LEVEL controls whose purposes, are self-evident, and a VCA (VCA Grouping) switch. When I/O modules are assigned to the Group module for VCA Grouping, the VCA switch activates that function.

3.9.5 Other Controls and Indicators

The remaining Group module controls and indicators include four LED indicators, the Group Mute switch, SOLO, DYNAMIC and PFL switches, and the Fader.

Of the four LED indicators, VCA (VCA Grouping), EQ (Equalizer) and PF/SOLO (Pre-Fader Listening) become illuminated to show that those functions have been selected, and PK (Peak) performs the same function as the PK indicator on the I/O module (see paragraph 3.7.5).

The Group Mute switch is used to mute/unmute the Group, and its built-in indicator can be programmed so as to either illuminate or extinguish when muting is in effect. For Mute indicator programming details, see Section 2, paragraph 2.5.2.1.

SOLO is used to direct the Group audio to the SOLO bus, setting the group into SOLO mode. Similarly, PFL is used to direct the Group audio to the PFL bus. Finally, the Fader controls the VCAs in all of the I/O modules assigned to the Group.

3.10 DYNAMICS MODULE

The optional Dynamics module (Figure 3-7) provides the console with four identical compressor/limiters, all having separate thresholds. The Dynamics module panel is arranged in four sections (one for each compressor/limiter), and the controls in each section include two ON switches, three LED indicators, four Compressor controls, one Limiter control, and one LED bar-graph meter.

The two ON switches are used to activate the Compressor (upper switch) and the Limiter (lower switch), and each of these has an associated LED indicator which becomes illuminated when the applicable switch is selected.

The PEAK indicator becomes illuminated when the Processor input audio level exceeds the threshold set for the limiter, i.e. when limiting is occurring.

The functions of the Compressor ATTACK and RELEASE controls are self-evident, the "F", "N" and "S" labels indicating Fast, Normal and Slow.

The Compressor THRESH (Threshold) control sets the level above which compressor reduction begins (-20 to +10 dB), and the RATIO control sets the compression ratio. Thus, if THRESH is set to −6 dB, and RATIO is set to 4, then a signal at 0 dB (6 db above the threshold) will be reduced to 1.5 dB (4:1 ratio) above the threshold, i.e −4.5 dB..

The Limiter THRESH control sets the limiting level (−12 to +12 dB). In an ideal limiter, the limiting ratio would be such that an infinite increase in the input signal would be required to produce a 1 dB increase in limiter output (limiting ratio = Infinity:1). In practice, limiting ratios of 60:1 to 80:1 are possible so that, hypothetically, an increase of 60 to 80 dB in the input signal would give rise to an increase of 1 dB in limiter output signal.

In the **MXP-2000** console, the limiting ratio is factory-set to 20 dB. Thus, when the Limiter THRESH control is set to any given level, an input signal which is 20 dB above that threshold results in an output level increase of 1 dB.

3.11 METER HOUSING

The Meter Housing (Figure 3-8) contains all of the console meters, six annunciators, a digital clock, and the PFL/Talkback speaker.

The GROUP meters at the left side of the housing show the levels of the audio signals in the four Group modules. The LEFT and RIGHT meters at the center of the housing can show Mix A level, Mix B level, Control Room Monitor level, or The Phase sum and difference, the metered signal being selected at the Monitor module, as described in paragraph 3.5.1.

The VU type LED bar-graph meters located to the right of the LEFT and RIGHT meters show the levels on the AUX MIX 1 (stereo), AUX MIX 2, AUX MIX 3, and PFL buses.

Six annunciators are arranged directly below the LEFT and RIGHT meters, these being labelled TB CALLING (talkback Calling), REH (Rehearse), ON AIR, PFL/SOLO, CONTROL L.S. MUTE (Control Room Loudspeaker Mute), and STUDIO L.S. MUTE (Studio Loudspeaker Mute). The functions of these annunciators are self-evident.

In addition to providing a 12/24 hour digital clock, the clock can be used, in other applications, to measure various timing functions.

SECTION 4
OPERATION

4.1 INTRODUCTION

This section of the manual provides information relevant to the operation of **MXP-2000** series consoles. This information outlines the methods used in selecting, processing and routing the console's input, output, monitor and communications signals. Operating information for the Parallel Editor Interface card and the Stereo Input, Group and Dynamics modules also is given for those consoles which include these options.

4.2 CONSOLE INPUTS

Inputs to the console can be either from microphones or from devices supplying signals at line level. The I/O (Input/Output) module selects either one of two inputs, and, depending upon the module configuration, these inputs can be from two microphones, two line level devices, or one microphone and one line level device.

Where a console fitted with standard I/O modules is fed with stereo signals, two I/O modules are required for each half of the stereo input, one for the left channel, and one for the right. Alternatively, where the stereo inputs are derived from line level sources such as turntables, cart machines, tape machines or compact disc units, a single Stereo Input module can accommodate both left and right stereo channels simultaneously.

In addition to the standard I/O module or Stereo Input module inputs, those consoles fitted with optional Group modules have separate Return inputs, each Group module incorporating one Return which accepts line level inputs.

4.2.1 I/O Module Input Switching

The I/O module Input Selection switches and controls are located at the top end of the panel (see Section 3, Figure 3-4). As has been previously stated, the I/O module has two-input capability, and these may be two microphone inputs, two line inputs, or one microphone input and one line input. The Input Selection switches for the standard I/O module are labelled MIC and LINE, the microphone input being designated INPUT 1 and the line input being designated INPUT 2.

In other I/O module configurations, the switches are labelled in accordance with the installed input cards, i.e. two microphone inputs or two line inputs. Regardless of configuration, the upper switch always selects INPUT 1 and the lower switch always selects INPUT 2.

Input connections to the I/O modules are made via the input/output connectors at the rear of the console, INPUT 1 being on pins 15 (shield), 16 (high), 44 (shield) and 45 (low), and INPUT 2 being on pins 12 (shield), 13 (high), 41 (shield) and 42 (low). It should be noted that the shields may be internally connected either to chassis ground or to audio ground, depending on the disposition of I/O module jumpers JW2, JW3, JW5 and JW6. For further jumper details, see Section 2, paragraph 2.5.1.1.

When INPUT 1 is selected, the appropriate signal is fed to the I/O Channel, its amplitude being set by the associated (upper) Input Level Trim control. Similarly, when INPUT 2 is selected, the signal fed to the Channel is adjusted by the lower Input Level Trim control.

NOTE: Provision is made for a Patch Send and Return at pins 7 (out) and 36 (in) on the input/output connector at the rear of the console. These Patch connections provide a means of inserting an external device into the audio path if so desired. If no external device is connected to pins 7 and 36, they must be wired together to complete the audio path.

Where capacitive microphones are used, the PHAN switch must be selected to provide phantom power for the microphone. It should be noted that selecting PHAN has no effect where Line Input cards are installed.

The PAD switch can be used, where required, to introduce a fixed 20 dB attenuator into microphone input circuits (regardless of microphone type). The PAD switch is NOT effective for Line Input cards.

The Ø (Phase) switch can be used to invert the channel signal, if so desired.

PSL (Pre-Select Listening) can be used to monitor the non-selected input, this being accomplished by placing that signal on the PFL bus and causing it to become audible at the Meter Housing speaker (see paragraphs 4.5.1 and 4.5.2). This momentary-contact switch must be held down for as long as it is desired to hear the non-selected signal. The PSL function is particularly useful when setting the comparative levels for INPUT 1 and INPUT 2.

4.2.2 Stereo Input Module Input Switching

The Stereo Input module is fitted with dual Line Input cards, and thus is capable of handling stereo inputs at line level (+4 dB). Provision is made in the module for selecting any one of up to three stereo input signals.

The Input Selection controls at the top of the panel include three switches for selecting between the three inputs, together with a single Input Level Trim control. The input selection switches are labelled IP1 (INPUT 1), IP2 (INPUT 2), and IP3 (INPUT 3), making their functions self-evident. The Input Level Trim control is used to adjust the amplitude of the selected input signal.

In addition to the input selectors, the MONO L (Mono Left) and MONO R (Mono Right) switches provide the means of either reversing the left and right channels, or of selecting either the left or the right side of the stereo signal for direction onto both left and right stereo outputs.

When MONO L is selected on its own, the left side of the stereo signal is directed into both the left and right stereo channels. Conversely, when MONO R is selected alone, the right side of the signal is directed into both channels. When MONO L and MONO R are selected together, the left side of the input signal is directed to the right stereo channel, and the right side of the input signal is directed to the left stereo channel.

The remaining control on this section of the panel is the Phase (Ø) switch. When Ø is selected, the phase of ONLY the left channel signal becomes inverted, thereby changing the relative phases of the right and left channels.

4.2.3 Return Signals

Inputs to the Return channels can be derived from any line level source, i.e. they can be returns from external devices or completely independent signals. The controls for these inputs are located on the RETURN section at the top of the Group module panel, and consist of PAN and level controls, and five switches labelled 1-2, 3-4, MIX, SOLO and PFL.

The PAN control positions the Return signal, and the RETURN control sets its level. The three switches located to the right of the PAN control are used to direct the Return to GROUP buses 1 and 2, GROUP buses 3 and 4, or the MIX bus. The remaining switches, SOLO and PFL are used to select the Return for SOLO or PFL operation. For descriptions of SOLO and PFL operations, refer to paragraphs 4.5.3 and 4.5.1, respectively.

4.3 CONSOLE OUTPUTS

The flexibility of the **MXP-2000** console is greatly enhanced by its multiple outputs, these offering a wide variety of operational advantages. The console outputs are described briefly below.

4.3.1 Main Outputs

The Mix A output is considered to be the main output from the console, and this is normally directed to the transmitter in a broadcasting operation, or to the master tape machine in a recording operation. Mix B exactly duplicates Mix A, but provision is made for separate Mix B level adjustment should it be required. Both of these Mixes are discussed below.

4.3.1.1 Mix A

The audio components comprising Mix A are derived from I/O modules, Stereo Input modules, and Group modules, all of these audio components being combined on the MIX bus.

Each I/O and Stereo Input module is provided with a MIX switch whose purpose it is to direct the module's Channel signal to the MIX bus. (See Section 3, Figures 3-4 and 3-5.) On both modules this switch is located just below the center of the control panel and to the right of the PAN control (I/O module) or BAL control (Stereo Input module). When this MIX switch is pressed, the Channel signal becomes part of Mix A.

In Audio Grouping mode, the Group audio signal is placed directly on the MIX bus without need for any switch selection. For further details of Audio Grouping, refer to paragraph 4.4.1.

Where Return signals are to be used as part of Mix A, each Return signal is directed to the MIX bus by selecting the MIX switch on the RETURN section at the top of the control panel on the appropriate Group module.

4.3.1.2 Mix B

Mix B exactly duplicates Mix A in all respects but, if so desired, it can be subjected to separate level control, and this provides a convenient means of supplying the broadcast material at a different level for use in recording or for any other required function. As a typical example, Mix B could be used to feed a cassette recorder having an input sensitivity of -20 dBu

Where it is required to adjust Mix B independently, it must first be separated from Mix A, and this is accomplished by pressing the SEP (Separate) switch on the Master module (see Section 3, Figure 3-1). Once Mix B has been separated from Mix A, the ST.B (Stereo B) control can be used to adjust the Mix B level without affecting Mix A.

The SEP and ST.B controls are located on the Master module, just below the center of the control panel.

4.3.1.3 Mix B Jumpers

Consoles shipped from the factory have Master module jumpers JW8 and JW10 installed. With this configuration, when Mix B is separately controlled, as described above, the Master Fader has no effect on the Mix B level. If so desired, Mix B can be controlled by both ST.B and the Master Fader, this being accomplished by removing jumpers JW8 and JW10, and then installing JW7 and JW9. It should be noted, however, that the Mix B level can never become greater that the Mix A level when the jumper configuration is changed in this manner.

4.3.2 Auxiliary Mix (SEND) Outputs

Three AUX MIX (or SEND) buses, S1, S2, and S3 are provided in the console, AUX MIX 1 being a stereo SEND, and AUX MIX 2 and AUX MIX 3 being mono SENDs. These can be used to create mixes for effects units such as time delays, echo boxes or reverberators, as well as providing cue (foldback) signals.

AUX MIX 1 also can be used as a secondary mix output from the console. It is assignable separately from Mix A and the audio group outputs (where optional Group modules are incorporated), thereby providing a total of four separately assignable mixes: Mix A/B, Audio Group 1-2, Audio Group 3-4, and AUX MIX 1.

AUX MIX 1 is particularly useful in the Secondary Audio Programming (Mix-minus) mode. This mode of operation is described in paragraph 4.4.3.

Inputs to the AUX MIX buses can be derived from Group audio, I/O module Channel signals, or Stereo Input module Channel signals. It is important to note that, except when the Channel is muted, its signals are directed, via level controls, to the AUX MIX buses at all times, and these signals can be either post-Fader or pre-Fader, depending upon switch selection. Where it is desired to suppress these signals, the level controls must be set fully counter-clockwise.

4.3.2.1 Auxiliary Mix Input Controls

The Auxiliary Mix input switches and controls are located on the I/O module, the Stereo Input module, and the Group module. On each of these modules, the controls are grouped together at the center of the control panel.

The Auxiliary Mix control section of the I/O module contains three PRE switch/level control pairs, each associated with a particular SEND. Where a PRE switch is NOT selected, the post-Fader Channel signal is directed to the appropriate bus. Conversely, when PRE is selected, pre-Fader audio is directed to the bus. In either case, the level control is used to adjust the signal amplitude.

Since AUX MIX buses S2 and S3 are for mono signals, the only controls required are the PRE switches and level controls. However, since S1 is a stereo bus, a PAN control is provided, and this is used for stereo signal panning.

The remaining control in the Auxiliary Mix control section is the MIX switch, this being used to direct the Channel signal to the S1 bus when that bus is to be employed in creating a separate mix. It is most important to note that, when the Channel signal is directed via the MIX switch to the S1 bus, the level and PAN controls normally associated with that bus are no longer effective, and the Channel signal is adjusted by means of the Channel PAN control and the main Fader.

The Aux Mix controls on the Stereo Input module are almost identical to those on the I/O module, differing only in that a BAL (Balance) control is used in place of the I/O module's PAN control.

The Aux Mix controls on the Group module are arranged in exactly the same manner as those on the I/O module. Except for the fact that Group audio signals are processed rather than Channel signals, the control operations also exactly duplicate those for the I/O modules.

4.3.2.2 Auxiliary Mix Output Controls

The Auxiliary Mix output controls are located on the Master module control panel. These controls are arranged in sections which are clearly labelled AUX 1, AUX 2 and AUX 3. Only two controls are associated with each Auxiliary Mix, these being a MUTE switch and a level control.

The AUX 3 level control is used to set the audio level on the S3 bus, and, as its label implies, the MUTE switch is used to suppress the bus output. The AUX 2 controls perform exactly the same functions for the S2 bus.

The AUX 1 controls differ slightly from the AUX 2 and AUX 3 controls in that the level adjustment is made by means of dual, concentrically mounted controls, the outer control being used to adjust the S1 left bus level, and the inner control being used to adjust the S1 right bus level.

4.3.3 Direct Line Outputs

All of the I/O modules and Stereo Input modules have Direct Line Output functions which provide line level feeds from selected module signals.

In the I/O module, the Direct Line Outputs can be selected from: INPUT 1, INPUT 2, the post-Equalizer signal, or the Channel output signal. In the Stereo Input module, they can be selected from: INPUT 1, INPUT 2, INPUT 3, or the Channel output. It should be noted that Direct Line Outputs from the Stereo module are stereo signals.

Direct Lines Outputs are useful where it is required to provide a separate output from a single channel. Typically, they can be used to record the output from the single channel, or as a single-channel feed to some other external device, i.e. in multiple commentary situations.

Where an I/O module is not being used in normal console operation, the Direct Line Output from that I/O can be used as a separate microphone or line amplifier. Similarly, an unused Stereo Input module can be used as a line amplifier or distribution amplier.

4.3.3.1 I/O Module Direct Line Out

In the I/O module, provision is made for directing one of four different signals to the Direct Line Output, these being INPUT 1, INPUT 2, the post-Equalizer, pre-Fader Channel signal, or the post-Fader Channel signal.

The I/O module Direct Line Out switches are mounted towards the top of the control panel, directly below the Input Selection switches, and comprise five switches and one level control. On the standard I/O module (one microphone input and one line input), the two top switches in the group are labelled MIC and LINE. In other configurations, these switches can both be labelled MIC or LINE. Regardless of configuration, the upper switch of the two always selects INPUT 1, and the lower selects INPUT 2.

The Direct Line Out switches are listed below, together with the signals they select. These switches are arranged mechanically so as to be mutually exclusive.

- Upper MIC or LINE: Selects the INPUT 1 signal
- Lower MIC or LINE: Selects the INPUT 2 signal
- EQ: Selects the post-Equalizer, pre-Fader Channel signal
- CHAN: Selects the post-Fader Channel signal

The level of the Direct Line Out signal is controlled by means of the Output Level Trim control, and the signal can be monitored by selecting the SOLO switch. For further information on SOLO operation, refer to paragraph 4.5.3.

4.3.3.2 Stereo Input Module Direct Line Out

As in the I/O module, the Stereo Input Module Direct Line Out switches are mounted towards the top of the control panel, directly below the Input Selection switches. Provision is made for selecting one of four signals for Direct Line Output, these signals being INPUT 1 (selected with IP1), INPUT 2 (selected with IP2), INPUT 3 (selected with IP3) and the Channel signal (selected with CHAN). The Output Level Trim control and the SOLO switch serve exactly the same purpose as their counterparts on the I/O module.

4.3.4 Audio Group Outputs

In the Audio Grouping mode, the signals from several sources are grouped together and directed to the Mix A output. The Group audio also is made available at the Group module's input/output connector at the rear of the console, thus providing additional outputs from the console. For further information on Audio Grouping refer to paragraph 4.4.1.

The Audio Group outputs can be used in several ways. Typically, in a recording application, the four outputs can be directed to a four-track recorder. Similarly, in a news-gathering situation, they can be used to supply four separate feeds/mixes to other studios or organizations.

4.4 MODES OF OPERATION

This section discusses some of the modes of operation available to the **MXP-2000**. It should be noted that these examples presuppose a console whose jumpers are unchanged from the factory configuration, and that some procedures may vary where the jumper configuration has been altered.

4.4.1 Audio Grouping

In the Audio Grouping mode, stereo or mono signals from the Channel PAN control are directed, via the GROUP buses, to pairs of Group modules. Signals from any number of sources can be directed to a single group module.

Within the Group module, all of the individual signals are combined and two paths are provided for the Group audio, each of them having a separate level control. The main Mix output is controlled by the Group's audio Fader, and the secondary output is controlled by the rotary LEVEL control (see Section 3, paragraph 3.9.4).

The main Mix output is directed to the MIX bus, with the output from the odd-numbered Group going to the left bus and that from the even-numbered Group going to the right bus. From the MIX bus, the stereo signal is directed to the Master module where it is used as a component of Mix A.

The secondary output from the Group module is a post-Equalizer, post-VCA signal. This is available at the module's input/output connector at the rear of the console on pins 16 (high), and 45 (low). This secondary output can be used for any user-designated application, as described in paragraph 4.3.4.

It should be noted that consoles are shipped from the factory with JW23 installed in the Group module. This jumper selects the pre-VCA/pre-Equalizer Group signal for delivery to the MIX bus. At the user's option, post-Equalizer/pre-VCA audio, or post-VCA audio may be selected by replacing JW23 with JW21 or JW22, respectively. Jumper configuration details for these selections are given in Section 2, paragraph 2.5.2.4.

4.4.1.1 I/O Module Inputs to Groups

The I/O module Group selection switches are mounted directly above the Writing Strip on the control panel. The switch labelled 1-2 directs the Channel signal to Groups 1 and 2, the left channel being placed on the GP1 bus, and the right channel being placed on the GP2 bus. Similarly, the switch labelled 3-4 directs the Channel signal to Groups 3 and 4, the left channel being placed on the GP3 bus, and the right channel being placed on the GP4 bus.

The PAN control located directly above the 1-2 switch is used to pan the Channel signal, and the signal level is adjusted by means of the Channel Fader.

4.4.1.2 Stereo Input Module Inputs to Groups

The Stereo Input module's Group selection switches are located on the control panels in a similar position to those on the I/O module. The switch arrangement also is similar to that on the I/O module, and these switches perform exactly the same functions. However, a BAL (Balance) control is used rather than the PAN control, this being used to balance the signal levels on the left and right channels.

4.4.1.3 Return Inputs to Groups

As has been previously stated (paragraph 4.2.3), the controls for a single Return are located on each of the Group modules. Where it is desired to direct the Return signal to a pair of Groups, the appropriate switch (1-2 or 3-4) must be selected. As with all other other panned signals, the left side is directed to the odd-numbered group bus, and the right side is directed to the even-numbered bus.

4.4.1.4 Group Output Control

All of the audio signals from the assigned Channels are summed in the Group module and then directed out via two separate paths, the first of these being a direct connection to the MIX bus and the second being the output on pins 16 (high) and 45 (low) on the input/output connector at the rear of the console.

NOTE: Provision is made for a Group Patch Send and Return at pins 7 (OUT), 36 (IN), and 22 (shield) on the input/output connector at the rear of the console. These patch connections provide a means of inserting an external device into the Group audio path if so desired. If no external device is connected to pins 7 and 36, they must be wired together to complete the Group audio path. This also holds true for the 2-Mix Patch on pins 9 (OUT), 8 (IN), and 38 (shield).

The Group output controls, PAN and LEVEL, are mounted directly above the Writing Strip on the Group module panel, and these are used, together with the main Fader, to adjust the Group output signals.

The output to the MIX bus is positioned by means of the PAN control, and its level is set by the Fader. In a console with factory-configured jumpers, the rotary LEVEL control has no effect on the level of this signal. However, if so desired, the jumper configuration can be changed so as to feed the post-VCA signal to the MIX bus, and this would allow control from the LEVEL control as well as the Fader. If this configuration is desired, jumper JW23 should be removed and JW22 should be installed. For jumper configuration details, refer to Section 2, paragraph 2.5.2.4.

The level of the balanced mono Group signal to the input/output connector is adjusted by means of the rotary LEVEL control. In a factory-configured console,

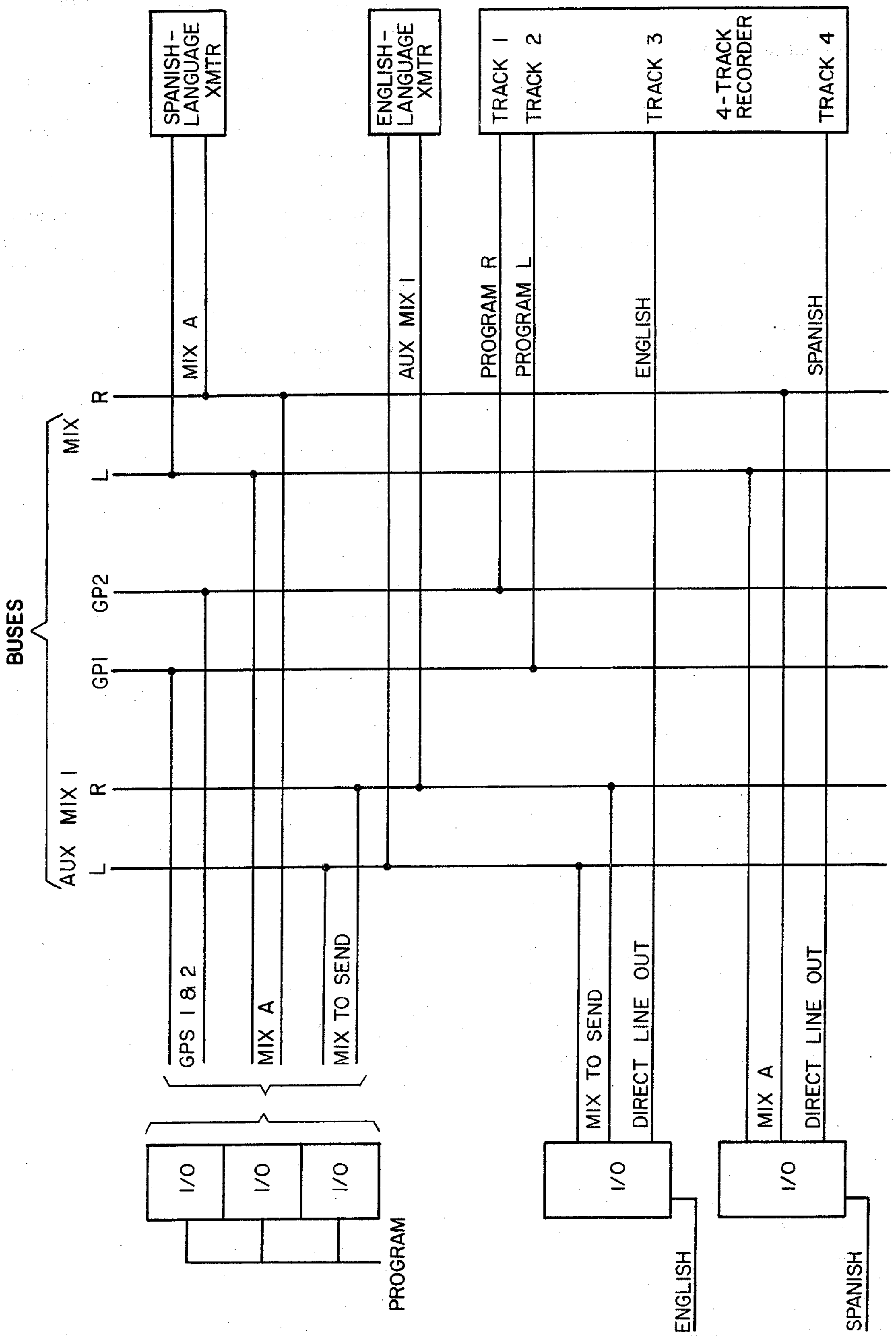

SPANISH-LANGUAGE XMTR
ENGLISH-LANGUAGE XMTR
TRACK 1
TRACK 2
TRACK 3
4-TRACK RECORDER
TRACK 4
MIX A
AUX MIX 1
PROGRAM R
PROGRAM L
ENGLISH
SPANISH
BUSES
MIX
R
L
GP2
GP1
AUX MIX 1
R
L
GPS 1 & 2
MIX A
MIX TO SEND
I/O
I/O
I/O
PROGRAM
MIX TO SEND
DIRECT LINE OUT
I/O
ENGLISH
MIX A
DIRECT LINE OUT
I/O
SPANISH

Figure 4-1. Secondary Audio Programming

announcer to another, etc., PFL provides a method of previewing the second source, setting its level, etc., before going "live".

4.5.1.1 Signals Available for PFL

All of the important signals in the console are available for Pre-Fader Listening. A complete list of these signals is given below, together with their methods of selection.

- I/O module Channel signal: Selected by the I/O module PFL switch, this being located at the bottom of the I/O module panel.
- Stereo Input module Channel signal: Selected by the Stereo Input module PFL switch mounted at the bottom of the Stereo Input module panel.
- Group Audio signal: Selected by the Group PFL switch mounted at the bottom of the Group module panel.
- Return signal: Selected by the PFL switch on the RETURN section of the appropriate Group module panel.

The volume level for the signals fed to the PFL speaker is adjusted by means of the TB/PFL LEVEL control. This control is mounted on the Communications module panel, just below the Talkback Microphone.

4.5.2 Pre-Select Listening (PSL)

Pre-Select Listening (PSL) performs a function similar to PFL, but is applicable only to those I/O modules having dual inputs. In these modules, one of the two inputs is selected as the Channel signal, and the other input can be used as second-source audio. The PSL function allows the second source, i.e. that source not selected as the Channel signal, to be previewed and/or adjusted before switching over from the first source to the second. The PSL switch is mounted at the top of the I/O module panel, just below the Phase switch.

4.5.3 SOLO Operation

The SOLO function provides a means of monitoring individual signals without interfering with the current broadcasting operation or recording session. Signals selected for SOLO operation are supplied to the Control Room Monitor speakers. A typical use for this mode could be to select and monitor some Channel, Group or Return signal which requires equalization, level adjustment, or other modification during an ongoing, "live" operation.

4.5.3.1 Signals selectable for SOLO Monitoring

All of the signals that can be selected for SOLO monitoring are listed below, together with their methods of selection.

- I/O module Channel signal: Selected by the Channel SOLO switch. This switch is located just below and to the left of the Channel Mute switch on the I/O module panel.
- I/O module Direct Line Out signal: Selected by the Direct Line Out SOLO switch, which is mounted immediately below the Output Level Trim control at the top of the I/O module panel.
- Stereo Input module Channel signal: Selected by the Channel SOLO switch located just below and to the left of the Channel Mute switch.
- Stereo Input module Direct Line Out signal: Selected by the Direct Line Out SOLO switch located immediately below the Output Level Trim control at the top of the Stereo Input module panel.
- Return signal: Selected by the Return SOLO switch in the RETURN section of the appropriate Group module panel.
- Group audio: Selected by the Group SOLO switch located just below and to the left of the Group Mute switch.

The volume level for the SOLO signals fed to the Control Room speakers is adjusted by means of the SOLO level control. This control is mounted at the top of the Control Room section on the Monitor module panel.

4.5.4 Equalization

Equalizer controls are provided on the I/O modules and Stereo Input modules, and equalization can be applied to all individual Channel signals. Equalizers also are provided on the Group modules, and these can be switched into either the Group audio path or the Return signal path.

The arrangements of the Equalizer control sections on each module are very similar, differing only slightly from one module to the other. The individual arrangements are discussed separately in paragraphs 4.5.4.1 through 4.5.4.3.

4.5.4.1 I/O Module Equalizer

The I/O module Equalization controls are located immediately below the Direct Line Out controls on the I/O module control panel, and include a High Pass

Filter switch, together with boost/cut controls for high (HF), mid (MID) and low (LF) frequencies. The HF and LF frequencies are fixed, but provision is made for sweeping the MID frequency.

The High Pass Filter is activated by selecting the /‾ switch, and is independent of the Equalizer. This filter has a cutoff frequency of 80 Hz. at 3dB down, and a rolloff characteristic of 12 dB per octave.

The Equalizer is activated by selecting EQ, and is independent of the High Pass Filter. The MID frequency section is adjustable between the limits 500 Hz. to 5 kHz. by means of the Mid Frequency Sweep control. The nominal boost/cut range for all sections is ±15 dB.

4.5.4.2 Stereo Input Module Equalizer

The Equalizer section of the Stereo Input module differs from that on the I/O module in that the High Pass Filter switch is replaced by the EQR switch, and the EQ switch is replaced by the EQL switch. Both of these changes are necessitated by the fact that the Equalizer in the Stereo Input module has to control both the left and right channels of the stereo signal.

The HF, MID, LF and Mid Frequency Sweep controls perform exactly the same functions as those on the I/O module, and can be applied to the left, the right, or both channels, depending upon the switch(es) selected.

When the EQR switch is selected, the right channel Equalizer becomes activated. Similarly, when the EQL switch is selected, the left channel Equalizer becomes activated. Where equalization is required for both channels, both EQL and EQR should be selected. Conversely, where equalization of the stereo signal is not required, neither EQL nor EQR should be selected.

4.5.4.3 Group Module Equalization

The Equalizer section of the panel is similar in most respects to that in the I/O module, differing only in that the High Pass Filter switch is replaced by the RET/GP switch.

The RET/GP switch is used to place the Equalizer into either the Return signal path (switch NOT pressed) or the Group audio path (switch pressed). Except for this switch, the Equalizer controls provide exactly the same functions, and are used in exactly the same manner, as those described for the I/O module.

4.5.5 Output Muting Functions

Each I/O module, Stereo Input module and Group module is fitted with Mute switch/indicators. In addition, provisions are made in the Master module for muting the Auxiliary Mixes.

4.5.5.1 I/O Module Channel Mute

The Channel Mute control is mounted on the I/O module control panel. This is a momentary-contact switch with built-in indicator, and it is used for muting/unmuting the I/O module, each operation of the switch reversing the previous state. The I/O can be programmed so as to be either muted or unmuted when the console is powered up, and the built-in indicator can be programmed so as to either illuminate or extinguish when the I/O is muted. Programming details are given in Section 2, paragraph 2.5.1.2.

4.5.5.2 I/O Module Automatic Muting

The I/O module can be programmed so that the inputs become automatically muted at the Control Room and/or Studio monitors when the Fader is moved away from the full down position (MUTE A and MUTE B).

Jumpers JW18 through JW21 are used, in conjunction with links on the input/output connector at the rear of the console, to program the desired muting functions. MUTE A becomes effective when INPUT 1 is selected, and MUTE B becomes effective when INPUT 2 is selected. Specific programming details are given in Section 2, paragraph 2.5.1.5.

A set of relay contacts is associated with MUTE A and MUTE B, and these are brought out to the input/output connector at the rear of the console. These contacts can be used to activate such external devices as "LIVE MIKE" or other indicators. On the input/output connector, MUTE A contacts are on pins 6 (normally closed), 21 (common) and 35 (normally open), while MUTE B contacts are on pins 5 (normally closed), 20 (common) and 34 (normally open).

4.5.5.3 Stereo Input Module Channel Mute

As in the I/O module, the Stereo Input module can be programmed so as to be either muted or unmuted at power-up, and the Channel Mute indicator can be programmed to be either illuminated or extinguished when the Channel is muted. These programming details are given in Section 2, paragraph 2.5.5.4.

4.5.5.4 Group Module Muting

The Group module muting control also is similar to that used in the I/O module, and the jumper configuration details for Channel ON or OFF at power up are given in Section 2, paragraph 2.5.2.1.

In addition to the jumper arrangements mentioned above, provision is made, by means of another jumper, to bypass the Group Mute Switch if so desired. This can be accomplished by simply removing Group module jumper JW28, as detailed in Section 2, paragraph 2.5.2.7.

4.5.5.5 Auxiliary Mix Muting

Each of the AUX 1, AUX 2 and AUX 3 sections on the Master module incorporates a MUTE switch. These are standard pushbutton switches which mute the appropriate channel when selected and unmute the channel when not selected.

4.6 MASTER MODULE FUNCTIONS

The Master module provides all of the Master controls for the Mix A, Mix B and Auxiliary Mix outputs, together with Rehearse/On Air switching.

The controls for the Auxiliary Mix sections are described in paragraph 4.3.2. Mix A and Mix B level controls are discussed in Paragraph 4.6.1, and Rehearse/On Air switching is discussed in paragraph 4.6.2.

4.6.1 Master Fader

The Master Fader always controls the level of the Mix A output. Fader control of Mix B depends upon whether or not the Mix B SEP switch is selected. In consoles using the jumper configuration set at the factory, the the Mix B level is controlled only by the rotary ST.B control when SEP is selected. However, the jumper configuration can be changed, if so desired, so that the separated Mix B can be controlled by both ST.B and the Master Fader. Programming details for these jumpers are given in paragraph 4.3.1.3.

4.6.2 Rehearse/On Air Switching

Rehearse/On Air (REH/ON AIR) switching provides a convenient means of muting the Mix A output whilst preparing for a broadcast. In REH mode, microphones and other program material inputs can be set up as required while the console output is muted. Once all preparations are complete, the console output can be unmuted by simply selecting ON AIR mode.

It is important to note that ON AIR can be selected at any time, regardless of current REH/ON AIR status, but that REH cannot be selected while the console is in ON AIR mode. If it is desired to go to the REH mode from ON AIR, the ON AIR mode must first be cleared.

In addition to muting and unmuting the console's output, the REH and ON AIR modes each control two sets of relay contacts, and these can be used to switch ON AIR/REHEARSAL sudio warning lights, becoming effective as either mode is selected. The relay contacts are brought out to the input/output connector at the rear of the console, as detailed below

RELAY	**Normally Open**	**Normally Closed**	**Common**
ON AIR Relay 1	Pin 32	Pin 3	Pin 18
ON AIR Relay 2	Pin 31	Pin 2	Pin 17
REH Relay 1	Pin 5	Pin 34	Pin 20
REH Relay 2	Pin 4	Pin 33	Pin 19

In addition to the REH and ON AIR switches, a CLR (Clear) switch is provided which can be used to clear either mode. However, it must be noted that, to preclude any possibility of inadvertently switching off the program material during a broadcast, a specific switching sequence must be followed when it is desired to clear the ON AIR mode.

To clear from ON AIR, the CLR switch is used in the same manner as a shift key on a typewriter. Both ON AIR and CLR must be pressed simultaneously, and the ON AIR switch must be released before the CLR switch. This results in the system reverting to the "no-mode selected" condition.

4.7 MONITOR MODULE FUNCTIONS

The Monitor module controls all of the console's monitoring functions. The control panel (see Section 3, Figure 3-2) is divided into four major sections, three of these sections providing the monitor controls required for specific areas, and the fourth containing controls relating to Editor Interface control.

4.7.1 Meter Switching

As its label implies, the METER section of the Monitor module provides the selection switches for inputs to the LEFT and RIGHT meters on the Meter Housing. By means of these switches, the meters can be used to monitor Mix A, Mix B, or the signal supplied to the Control Room monitor speakers. (See paragraph 4.7.2, below.) In addition, the Ø (Phase) switch can be used to direct the sum and difference of the Mix A left and right channels to the meters, causing their relative phases to be displayed.

4.7.2 Control Room

The CONTROL ROOM section incorporates the switches needed to select the desired signals for supply to the Control Room speakers and the HEADPHONES connector. It also houses the SOLO level control (see paragraph 4.5.3), and level controls for the signals to the Control Room speakers and HEADPHONES connector.

The signals selectable for Control Room monitoring are; Mix A, Mix B, S1 (Auxiliary Mix 1), S2 (Auxiliary Mix 2) and S3 (Auxiliary Mix 3). The mono sum of the Mix A signal can be directed to both left and right speakers by selecting the upper MONO switch, and the mono sum of the selected signal can be directed to both speakers by means of the lower MONO switch.

In addition to the console signals, provision is made for monitoring user-designated external signals on the Control Room speakers. These signals are connected via the input/output connector at the rear of the console, and are labelled EXT 1, EXT 2, EXT 3 and EXT 4. Pin connections for the external signals are given below.

SIGNAL	**HIGH**	**LOW**
EXT 1 R	Pin 15	Pin 44
EXT 1 L	Pin 16	Pin 45
EXT 2 R	Pin 13	Pin 42
EXT 2 L	Pin 14	Pin 43
EXT 3 R	Pin 11	Pin 40
EXT 3 L	Pin 12	Pin 41
EXT 4 R	Pin 9	Pin 38
EXT 4 L	Pin 10	Pin 39

The MUTE L and MUTE R switches are used to mute left or right Control Room speakers. Where it is desired to mute both speakers, both of these switches should be selected. Alternatively, both Control Room speakers can be muted by means of the MON switch (located at the bottom of the CONTROL ROOM section of the panel), but this switch also will cause the Studio monitor to be muted if jumper JW15 is installed.

Two controls are used for setting the monitor signal levels, the MONITOR control setting the level to the Control Room and Studio speakers, and the 🎧 control setting the level to the HEADPHONES connector, which is located at the bottom of the panel.

4.7.3 Studio

The STUDIO section of the Monitor module panel provides switching and controls for the Studio monitors, and allows for direct selection of the user-designated external signals EXT 1 and EXT 2, and the Auxiliary Mix signals S1, S2 and S3.

In addition to the signals listed above, the SEL (Select) switch can be used to direct the Control Room's selected signal to the Studio monitors, if so desired, thereby making all of the Control Room monitor signals available to the Studio monitors.

As previously stated, the level to the Studio speakers is adjusted by the MONITOR control on the CONTROL ROOM section of the panel. The 🎧 control in the STUDIO section is used to set the level to external headsets, these being labelled Headphone A and Headphone B. The external headsets are connected via the input/output connector at the rear of the console, with Headphone A connected to pins 3 (left) and 32 (right), and Headphone B connected to pins 2 (left) and 31 (right). It should be noted that Headphone A carries program material only, whereas Headphone B carries program material plus Communication audio.

4.7.4 Video Editor Controls

The remaining controls on the Monitor module are the BYPASS and AUTOMUTE controls. Both of these switch/indicators are programmable so as to be either illuminated or extinguished when their functions are selected, and both are used in conjunction with the optional Parallel Video Editor Interface module.

The BYPASS switch, when selected, bypasses the Editor Interface control. The AUTOMUTE switch is used to mute those Editor Interface channels which are not currently under Editor Control.

4.7.4.1 Editor Interface Monitoring

In editing modes, the Monitor module offers a ready means of monitoring replays from the Record VTR (Video Tape Recorder). If the VTR outputs are connected to the Monitor EXT 1 RIGHT and EXT 1 LEFT inputs, internally connected commands from the Editor Interface Card automatically interrupt the normal Monitor signal flow and inject the VTR signals, this occurring regardless of Monitor selector switch position. This automatic editor control of the Monitor signal provides a simple means of monitoring VTR replays, and is most convenient in post-production operations where dialog is often recorded on the left channel and effects are recorded on the right.

On the Monitor module input/output connector, EXT 1 RIGHT is fed in on pins 15 (high) and 44 (low), while EXT 1 LEFT is on pin 16 (high) and pin 45 (low).

4.8 COMMUNICATIONS MODULE FUNCTIONS

The Communications module is used to control all of the console's communications functions, and incorporates the Talkback microphone, test oscillators with frequency and level controls, and distribution switching for the oscillator and talkback signals.

4.8.1 Talkback Controls

The Talkback microphone is located at the top of the control panel, and the TB/PFL (Talkback/PFL) control is just below the microphone. So long as neither PFL nor PSL is selected anywhere in the console, the TB/PFL control is used to adjust the volume of the Talkback from an external communication net. Talkback from any external source can be brought into the console via the Communications module input/output connector at the rear of the console. Pin connections for these inputs are given below.

TALKBACK SIGNAL	HIGH INPUT	LOW INPUT
TB IN 1	pin 11	pin 40
TB IN 2	pin 10	pin 39
TB IN 3	pin 9	pin 38
TB IN 4	pin 8	pin 37

The presence of an external Talkback signal is indicated by the illumination of the TB CALLING annunciator on the Meter Housing.

When PFL or PSL is selected, the PFL/PSL signal (see paragraphs 4.5.1 and 4.5.2) is heard in the Meter Housing speaker, overriding any external Talkback.

Where it is desired to provide local Talkback from the Studio to the console, the optional Relay Card **MXBK-RL21** must be installed. This option is more fully discussed in paragraph 4.11.

4.8.2 Oscillator and Noise Generators

The OSCILLATOR section of the control panel contains all of the necessary controls for the Oscillator and Noise Generators. The ON switch is used to activate this section, and the PINK and WHT (White) switches are used to select either pink or white noise if these signals are desired.

The Oscillator becomes activated when any one of the multiplier switches, x1, x10 or x100 is selected. The FREQ (Frequency) control sets the Oscillator's base frequency between the limits 15 Hz. to 150 Hz., thus providing an overall frequency range of 15 Hz. to 15 kHz.

The remaining switch in the OSCILLATOR section is the IDNT (Identification) switch. When selected, this switch causes a two-tone "warble" signal to be generated, this signal alternating between 1 kHz. and 2 kHz. at a 0.5 Hz. rate.

4.8.3 Oscillator Assignment

The ASSIGNMENT section switches are used to direct any of the signals generated in the Oscillator section to their various destinations. Also included in this section is the OSC LEVEL control which is used to adjust the level of those signals.

Each of the ASSIGNMENT switches is used to direct the oscillator signal to a specific bus or set of buses, and each switch is labelled accordingly, as detailed below.

GPS (Groups)	Directs signal to the GP1, GP2, GP3 and GP4 buses.
MIX	Directs signal to the MIX L and MIX R buses.
S1	Directs signal to the Auxiliary Mix 1 L and R buses.
S2	Directs signal to the Auxiliary Mix 2 bus.
S3	Directs signal to the Auxiliary Mix 3 bus.

It should be noted that the ASSIGNMENT switches can be selected individually or simultaneously in any desired combination. However, where GPS and MIX are simultaneously selected, MIX overrides GPS so as to avoid double feed.

4.8.4 Talkback Assignment

The TALKBACK SELECT switches are used to direct the Talkback microphone audio to various buses, the Studio monitors, and/or to any one of five user-designated destinations.

The SLATE switch directs the microphone audio to the four GROUP buses and the MIX L and MIX R buses, while AUX S1, AUX S2 and AUX S3 direct it to Auxiliary Mix buses 1, 2 and 3, respectively.

The user-designated external outputs are connected via the input/output connector at the rear of the console as detailed below.

SWITCH	HIGH OUTPUT	LOW OUTPUT
EXT 1	pin 16	pin 45
EXT 2	pin 15	pin 44
EXT 3	pin 14	pin 43
EXT 4	pin 13	pin 42
EXT 5	pin 12	pin 41

The TALKBACK SELECT switches can be selected individually or simultaneously in any combination.

4.9 METER HOUSING

The Meter Housing (Section 3, Figure 3-8) contains all of the console meters, annunciators for various functions, a digital clock, and the PFL/Talkback speaker.

4.9.1 Group Meters

The Group meters illustrated in Figure 3-8 are moving coil types with VU scales, as used in **MXP-2016** and **MXP-2016S1** consoles. In the **MXP-2016P** and

MXP-2016PS1 consoles, these meters are replaced by PPM (Peak Program) types. The Group meters are used only to monitor the Group audio signals, each Group being associated with a particular meter, i.e. GROUP 1, GROUP 2, GROUP 3, and GROUP 4.

4.9.2 LEFT and RIGHT Meters

The LEFT and RIGHT meters illustrated in Figure 3-8 also have VU scales, and the same comments apply as for the Group meters.

The signal presented to the LEFT and RIGHT meters can be Mix A, Mix B, the Control Room Monitor signal, or the Mix A phase signal, and is selected at the Monitor module, as explained in paragraph 4.7.1.

4.9.3 Auxiliary Mix and PFL Meters

The Auxiliary Mix meters are vertically mounted LED bar-graph types with dB scales, and these are used to monitor the AUX MIX (SEND) buses at all times. It should be noted that separate meters are provided for the left and right channels of the stereo AUX MIX 1 bus.

The PFL meter is similar in type to the Auxiliary Mix meters, and is used for monitoring the signal on the PFL bus.

4.9.4 Annunciators and Clock

Six LED annunciators are provided to show the status of various console functions. The purposes of these annunciators are listed below.

TB CALLING (Yellow)
Illuminates when an external Talkback signal is present.
REH (Yellow)
Illuminates when the console is in Rehearse mode
ON AIR (Red)
Illuminates when the console is in On Air mode
PFL/SOLO (Green)
Illuminates when any PFL or SOLO switch is selected
CONTROL L.S. MUTE
Illuminates when the Control Room speakers are muted
STUDIO L.S. MUTE
Illuminates when the Studio speakers are muted

In addition to showing time in either 12-hour or 24-hour format, the digital clock can be used (with the appropriate optional keypad) to measure various timing functions.

4.10 DYNAMICS PROCESSING

Dynamics Processing of an audio signal is defined as the manipulation of the range between the maximum and minimum volumes of that signal. The optional Dynamics module provides four dynamics processing channels in which both COMPRESSOR and LIMITER functions are available.

4.10.1 Dynamics Channel Selection

Up to four inputs to the Dynamics module can be taken from I/O modules, Stereo Input modules, Group modules, or the Master module, each of these modules being fitted with a DYNAMICS switch to allow for Dynamics channel selection.

The DYNAMICS switches are thumbwheel types, and have display windows in which the selected Dynamics channel is indicated. Where Dynamics Processing is not selected, the window displays the letter L (for Local).

4.10.2 Dynamics Module

The Dynamics module panel (see Section 3, Figure 3-7) is divided into four identical Processor sections, each of these being identified with a channel number. Each Processor has the following controls:

COMPRESSOR Section	**LIMITER Section**
ON switch and indicator	ON switch and indicator
ATTACK control	THRESH control
RELEASE control	PEAK indicator
RATIO control	
THRESH (Threshold) control	
GAIN REDUCTION meter	

NOTE: Where both Compressor and Limiter are activated together, the Compressor controls must be set before the Limiter controls.

4.10.3 COMPRESSOR

The compression function reduces the gain of signals whose amplitude exceeds a set reference level (called the Threshold). Compression is activated by means of the COMPRESSOR ON switch, and is controlled by the THRESH, RATIO, RELEASE, and ATTACK controls.

The THRESH control sets the compression threshold between the limits −20 dB to +10 dB, and the RATIO control sets the degree to which the signal will be compressed. The compression ratio describes the gain reduction between the compressor input (above the

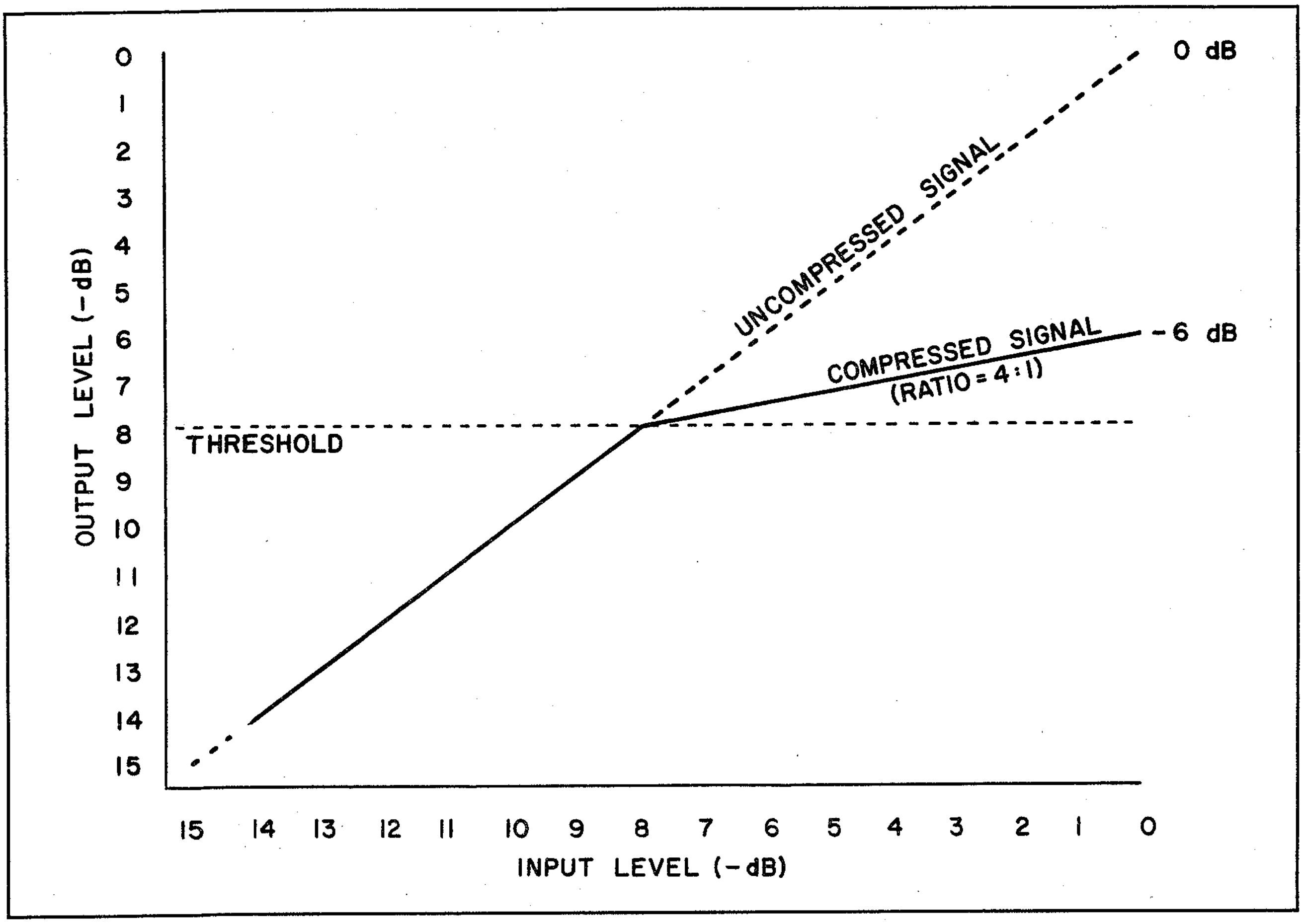


Figure 4-2. Compression Transfer Curve

threshold) and the compressor output, i.e. if an input level increase of 4 dB causes the output level to increase by 1 dB, the compression ratio is said to be 4:1. Figure 4-2 illustrates the differences between uncompressed and compressed signals with hypothetical THRESH and RATIO settings of −8 dB and 4 respectively.

As can be seen from Figure 4-2, the peak of the compressed signal falls below that of the unprocessed input signal. In most systems, where compression is introduced, it becomes necessary to adjust the output level so as to restore the original peak value. This is not required in **MXP-2000** series consoles, since the output is restored automatically to close to its original peak level. This is illustrated in Figure 4-3.

The ATTACK control is used to set the time required for the processor to modify its gain from its starting level to the compressed gain level. This control is necessary because, if the processor were to operate instantaneously in accordance with the input waveform, its non-linear gain characteristics would result in severe distortion. For similar reasons, the RELEASE control is necessary to preclude distortion as the input signal level falls below the compression threshold. These controls should be adjusted so as to obtain the desired degree of compression without introducing those forms of distortion variously called "pumping", "breathing" or "shimmering".

When the COMPRESSOR is activated, the GAIN REDUCTION meter indicates (in dB) the instantaneous degree of gain reduction that is occurring within the COMPRESSOR.

4.10.4 LIMITER

In the LIMITER section, the ON switch is used to activate the LIMITER, and the associated indicator becomes illuminated when this switch is selected. Limiting is used to confine the processor output to a preset level, this level being set between the limits −12 dB to +12 dB by the LIMITER THRESH control.

The PEAK indicator becomes illuminated when the Processor audio exceeds the limiting threshold. In normal operation, this indicator should flash on only as peaks occur in the program material. Where the

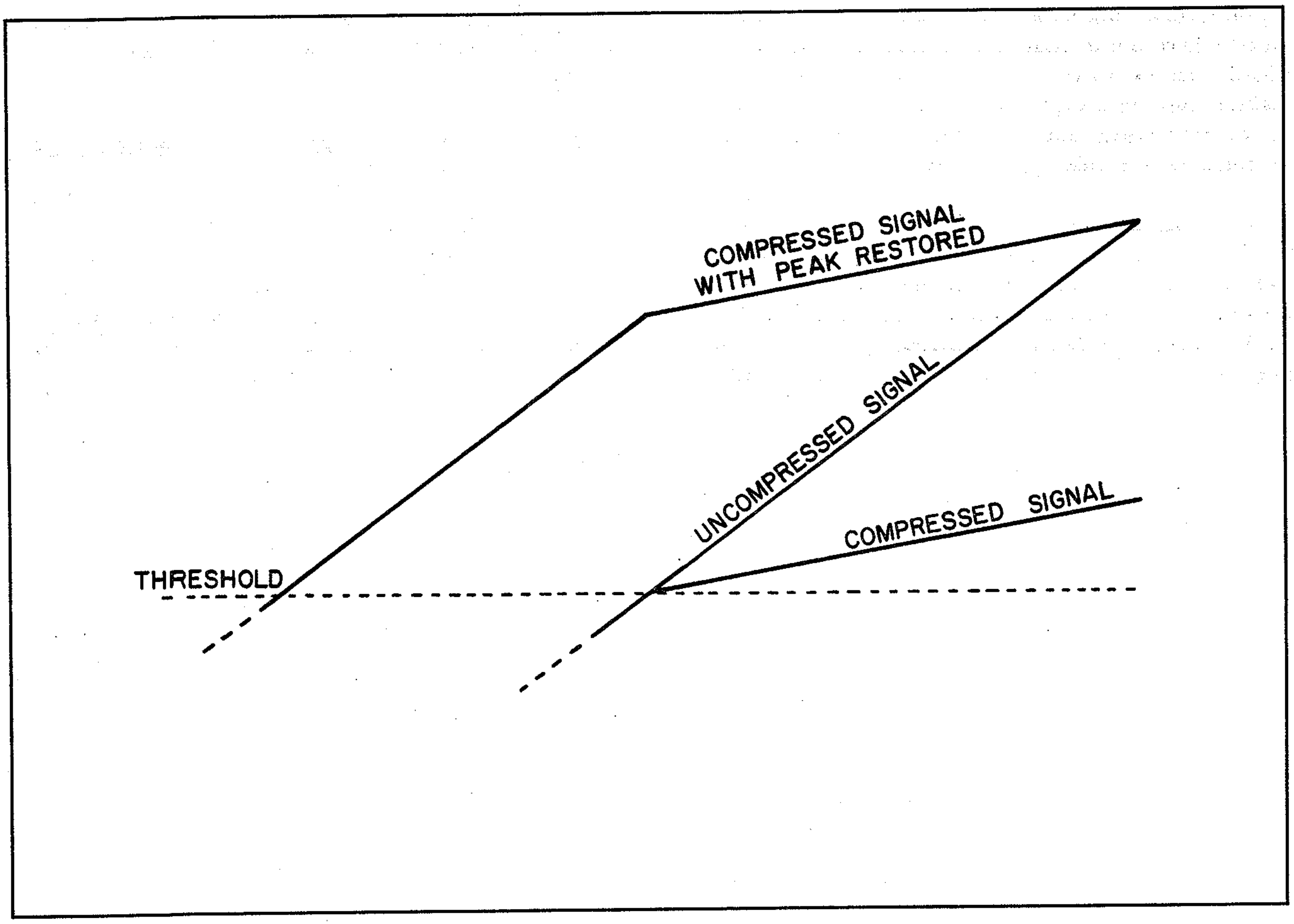


Figure 4-3. Peak Level Restoration

PEAK indicator is constantly illuminated, or flashes on too frequently, it is an indication that excessive limiting is occurring, and this should be corrected by adjusting the Input Level Trim control on the offending module.

4.11 RELAY CARD MXBK-RL21

Relay Card **MXBK-RL21** (commonly called the Relay Card) can be fitted to any Input/Output module in **MXP-2000** series consoles, and can provide either one of two functions, these being Reverse Talkback OR Automatic Pre-Fader Listening (PFL). It is important to note that these functions are mutually exclusive, and only one or the other can be provided for any given I/O module.

The Reverse Talkback function provides a means of calling back from the Studio to the Control Room, and any number of I/O modules can be provided with this option, thereby allowing Reverse Talkback from several different sources within the Studio (or Studios).

The Automatic PFL function causes the I/O module Channel signal to be directed automatically to the PFL speaker on the console when the Fader is set to the full down position. This option can be fitted to a single module or to multiple modules in any desired combination.

4.11.1 Automatic PFL Operation

Where the Relay Card is to be used to provide the Automatic PFL function, JW15 must be installed on the I/O module. In this application, INPUT 1 must be selected on the I/O module in which the Relay Card is installed. Further, it is strongly recommended that Automatic PFL be used only in those modules using Line Input cards for INPUT 1. Operation is fully automatic, the I/O module's Channel signal being directed to the PFL speaker as soon as the Fader is set to the full down position.

4.11.2 Reverse Talkback Operation

If the Reverse Talkback function is required, an external REVERSE TALKBACK switch must be connected between pin 2 and pin 17 on the I/O module's input/output connector at the rear of the console. In cases where more than one I/O module is to be provided with the Reverse Talkback function, a separate switch must be installed for each module. It is most important to note that JW15 on the I/O module must be removed for this application.

In this application also, INPUT 1 must be selected on the I/O module. In addition, it is recommended that the Reverse Talkback function be provided only in those I/O modules using Microphone Input cards for INPUT 1. Reverse Talkback operation is extremely simple, communication from the Studio to the Control Room being accomplished by pressing the external REVERSE TALKBACK switch and speaking into the appropriate microphone.

4.12 EDITOR INTERFACE CARD MXBK-EI21

Where the optional Editor Interface Card, **MXBK-EI21**, is fitted, the major operating controls used are those on the associated Video Editor unit. The only console controls that are applicable to Editor operations are the AUTOMUTE and BYPASS switches on the Monitor module. The functions of these switches are given in paragraph 4.7.4.

23 February 1987

MXP-2000 OPERATION AND MAINTENANCE MANUAL UPDATE

The insert pages provided in this package are to be used for updating all current editions of Document T-9482-342-1 (MXP-2000 Series Professional Mixing Console Operation and Maintenance Manual). The insertion instructions for the changed pages are given in paragraph A. below. In addition to the changed pages, a new Manual section is provided for insertion.

A. CHANGE PAGES:

Remove Old Pages	**Insert New Pages**
v through viii	v through ix
Page 6-43/6-44	Page 6-43/6-44

B. INSERT NEW SECTION:

SECTION 5 TEST AND ADJUSTMENT (Pages 5-1 through 5-12)

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SECTION 5
TEST AND ADJUSTMENT

5.1 INTRODUCTION

This section provides those test and adjustment procedures which can be performed by the user, the procedures being presented in the order in which they should be performed when the whole console is to be set up. Where individual adjustments are being made, it must be remembered that results may be affected by some preceding adjustment which has not been carried out, i.e. DC voltage level, meter setup, etc.

5.2 TEST EQUIPMENT

The test equipment required for **MXP-2000** alignment is listed below:

Digital Voltmeter	Fluke 77 or eq.
AC Voltmeter	HP 400FL or eq.
Function Generator	Krohn-Hite 5800 or eq.
Extender Card	Sony T-9481-879-1
Distortion Analyzer	Tektronix TM5006 or eq.
Dual Trace Oscilloscope	Tektronix 2236 or eq.
Frequency Counter	HP 5381 or eq.

5.3 EQUIPMENT SETUP

Set the controls on the various modules as detailed in paragraphs 5.3.1 through 5.3.6 below.

5.3.1 Communications Module

TB/PFL control	Fully CW
OSCILLATOR	Off
OSC LEVEL	0 dB (detent)
FREQ	1 kHz (detent)
OSCILLATOR Multipliers	x10
ASSIGNMENT	None

5.3.2 Monitor Module

METER select	MIX A
All rotary controls (4)	Fully CW
CONTROL ROOM select	MIX A
STUDIO select	SEL
MONO, MUTE L, MUTE R	Not selected
MON	Unmuted
AUTO MUTE, BYPASS	Not selected

5.3.3 Master Module

All rotary controls (5)	Fully CW
MUTE switches (3)	Not selected
SEP, REH, ON AIR	Not selected
Master Fader	0 dB
DYNAMIC	L (Local)

5.3.4 Group Modules

5.3.4.1 RETURN Section

RETURN PAN	Centered
RETURN level control	Fully CW
MIX, 1-2, and 3-4 switches	Not selected
SOLO, PFL	Not selected

5.3.4.2 Equalizer Section

EQ and RET/GP	Not selected
All rotary controls (4)	Centered

5.3.4.3 SENDS Controls

PRE 1, PRE 2 and PRE 3	Not selected
MIX	Not selected
Level Controls (3)	Fully CW
PAN	Centered (detent)

5.3.4.4 Other Controls

Group PAN	Centered (detent)
LEVEL	Fully CW
VCA, SOLO and PFL	Not selected
Group Mute	Unmuted
Group Fader	0 dB
DYNAMIC	L (Local)

5.3.5 Input/Output Modules

5.3.5.1 Input/Direct Line Out Section

LINE (Input)	Selected
CHAN (Direct Output)	Selected
Input Level Trim controls (2)	Fully CW
Output Level Trim	Fully CW
MIC (Input)	Not selected
PHAN, PAD, Phase and PSL	Not selected
MIC, LINE and EQ (Direct Outputs)	Not selected
SOLO	Not selected

5.3.5.2 Equalizer Section

EQ and High Pass Filter switches	Not selected
All rotary controls (4)	Centered

5.3.5.3 SENDS Controls

PRE 1, PRE 2 and PRE 3	Not selected
MIX	Not selected
Level Controls (3)	Fully CW
PAN	Centered (detent)

5.3.5.4 Other Controls

Channel PAN	Centered (detent)
MIX, 1-2 and 3-4	Not selected
Channel Mute	Muted
SOLO	Not selected
Channel Fader	0 dB
VCA GP	L (Local)
DYNAMIC	L (Local)
PFL	Not selected

5.3.6 Stereo Input Modules

5.3.6.1 Input and Direct Line Out Section

IP 1 (Input)	Selected
CHAN (Direct Output)	Selected
Input Level Trim	Fully CW
Output Level Trim	Fully CW
MONO L, MONO R and Phase	Not selected
IP 2 and IP 3 (Input)	Not selected
IP 1, IP 2 and IP 3 (Direct Outputs)	Not selected
SOLO	Not selected

5.3.6.2 Equalizer Section

EQ switches (2)	Not selected
All rotary controls (4)	Centered

5.3.6.3 SENDS Controls

PRE 1, PRE 2 and PRE 3	Not selected
MIX	Not selected
Level Controls (3)	Fully CW
BAL	Centered (detent)

5.3.6.4 Other Controls

Channel BAL	Centered (detent)
MIX, 1-2 and 3-4	Not selected
Channel Mute	Muted
SOLO, PFL	Not selected
Channel Fader	0 dB
VCA GP	L (Local)
DYNAMIC	L (Local)

5.4 DC VOLTAGES

The following procedure is used to check the Power Supply DC outputs. Any voltage falling outside the specified limits must be adjusted within the Power Supply. The appropriate adjustment control for each voltage is listed in Table 5-1, and these controls can be accessed by unfastening the eight retaining screws and removing the Power Supply top cover.

STEP 1. Set the Power Supply switch to OFF

STEP 2. Remove the extreme right-hand module from the console to gain access to the DC voltage connector, CNJ42

STEP 3. Set the Power Supply switch to ON

STEP 4. Using the Digital Voltmeter (negative probe to CNJ42-12), measure the voltages at the points listed in Table 5-1.

STEP 5. Upon completion of DC voltage measurements and adjustments, set the Power Supply switch to OFF and reinstall the extreme right-hand module into the console.

CNJ42 PIN #	NOMINAL VOLTAGE (VDC)	LIMITS (VDC)	POWER SUPPLY ADJUSTMENT
6	+5 (LOGIC)	+4.90 to 5.10	RV4
7	+5 (REF)	+4.99 to 5.01	RV1
8	−18	−18.0 to −18.2	RV3
9	+18	+18.0 to +18.2	RV2
10	+48	+47.9 to +48.1	RV5

Table 5-1. DC Voltage Limits

5.5 METER HOUSING CALIBRATION

5.5.1 Meter Mechanical Adjustments

Before calibration can be carried on the on the analog meters, they must first be set to mechanical zero in accordance with the following procedure:

STEP 1. Set the Power Supply switch to OFF

STEP 2. At the rear of the Meter Housing, unfasten the two retaining screws and lower the hinged panel

STEP 3. On the GROUP 1 meter, set the mechanical adjustment screw so that the pointer lies exactly on the mark at the low end of the meter scale

STEP 4. Repeat STEP 3 for the GROUP 2, GROUP 3, GROUP 4, LEFT and RIGHT meters

5.5.2 Analog Meter Calibration

The general method used for meter calibration is to apply a known reference level to the meter and then make any adjustment that may be necessary. All of the controls for analog meter adjustment are located on the Panel Meter Board (PMB) in the Meter Housing. The analog meter calibration procedure is given below.

NOTE: All of the following meter and bar-graph indicator adjustment procedures assume that the desired standard is 0 VU = + 4 dBu. Where any other standard is desired, the quoted AC Voltmeter indications should be adjusted accordingly

5.5.2.1 GROUP Meters

STEP 1. Set the Power Supply switch to ON

STEP 2. On the Communications module, set the OSCILLATOR to ON. Verify that the OSCILLATOR FREQ control is set to the detent position and that the x10 multiplier is selected

STEP 3. On the ASSIGNMENT section of the Communications module, select the GPS switch

STEP 4. Connect the AC Voltmeter between pins 16 (Group Out High) and 45 (Group Out Low) on the input/output connector for the GROUP 1 module

STEP 5. Set the OSC LEVEL control so that the AC Voltmeter indication becomes +4 dBu

STEP 6. At the Meter Housing, adjust RV6 on the PMB board so that the GROUP 1 meter indication becomes exactly 0 VU

STEP 7. Adjust RV3 on the PMB board so that the GROUP 2 meter indication becomes exactly 0 VU

STEP 8. Adjust RV5 on the PMB board so that the GROUP 3 meter indication becomes exactly 0 VU

STEP 9. Adjust RV4 on the PMB board so that the GROUP 4 meter indication becomes exactly 0 VU

5.5.2.2 LEFT and RIGHT Meters

STEP 1. Set the OSC LEVEL control fully CCW

STEP 2. Connect the AC Voltmeter between pin 12 (high) and pin 41 (low) on the Master module input/output connector

STEP 3. On the ASSIGNMENT section of the Communications module, deselect GPS and select MIX

STEP 4. Advance the OSC LEVEL control until the AC Voltmeter indication becomes +4 dBu

STEP 5. On the METER section of the Monitor module, select MIX A

STEP 6. Adjust RV1 on the PMB board so that the LEFT meter indication becomes exactly 0 VU

STEP 7. Adjust RV2 on the PMB board so that the RIGHT meter indication becomes exactly 0 VU

5.5.3 LED Bar-Graph Display Calibration

The five LED bar-graph displays are calibrated using the same fundamental method as that used for the analog meters. All of the adjustment controls are located beside the appropriate displays on the front of the Display Meter Board (DMB), and the Meter Housing plex panel must be removed to access these controls.

5.5.3.1 Plex Panel Removal

To remove the plex panel from the front of the Meter Housing, proceed as follows:

STEP 1. Look into the rear of the Meter Housing and observe the openings at the extreme ends of the metal front plate. Those at the left-hand end are circular, while those at the right-hand end are in the form of slots.

CAUTION

WHEN PERFORMING STEP 2, DO NOT USE ANY IMPLEMENT OTHER THAN THE ERASER END OF A COMMON LEAD PENCIL TO APPLY PRESSURE TO THE REAR OF THE PLEX PANEL

STEP 2. Insert the eraser end of a common lead pencil into the upper opening at the right-hand of the panel, and apply just enough pressure to cause the corner of the panel to snap out of place

STEP 3. Apply similar pressure to the panel at the other three openings until the panel is completely removed from the Meter Housing

5.5.3.2 AUX Displays Calibration

STEP 1. Set the Power Supply switch to ON

STEP 2. On the Communications module, set the OSCILLATOR to ON. Verify that the OSCILLATOR FREQ control is set to the detent position and that the x10 multiplier is selected

STEP 3. On the ASSIGNMENT section of the Communications module, select S1, S2 and S3

STEP 4. Connect the AC Voltmeter between pin 16 (Send 1 Left High) and pin 45 (Send 1 Left Low) on the Master module input/output connector at the rear of the console

STEP 5. Set the OSC LEVEL control so that the AC Voltmeter indication becomes +4 dBu

STEP 6. At the Meter Housing, adjust RV1 on the DMB board so that the AUX 1L meter indication becomes exactly 0 VU

NOTE: The bar-graph indicates 0 VU when the first red segment becomes illuminated. Set the control so that only green segments are illuminated, and then advance the control until the first red segment just appears.

STEP 7. Adjust RV2 so that the AUX 1R meter indicates exactly 0 VU

STEP 8. Adjust RV3 so that the AUX 2 meter indicates exactly 0 VU

STEP 9. Adjust RV4 so that the AUX 3 meter indicates exactly 0 VU

5.5.3.3 PFL Display Calibration

STEP 1. On the Communications module, set the OSCILLATOR to ON. Verify that the OSCILLATOR FREQ control is set to the detent position and that the x10 multiplier is selected

STEP 2. On the METER section of the Monitor module, select SEL

STEP 3. On the ASSIGNMENT section of the Communications module, select the GPS switch

STEP 4. Connect the AC Voltmeter between pins 16 (Group Out High) and 45 (Group Out Low) on the input/output connector for the GROUP 1 module

STEP 5. Set the OSC LEVEL control so that the AC Voltmeter indication becomes +4 dBu

STEP 6. Press and hold the PFL switch on any Group module, and adjust RV5 on the PMB board so that the PFL meter indicator becomes exactly 0 VU

5.5.4 Annunciators

The Meter Housing annunciators should be checked before replacing the plex panel. Use the following procedure:

STEP 1. Set the Function Generator to supply a 1000 Hz signal at 0 dBm, and connect it between pins 11 (high) and 40 (low) on the input/output connector for the Communications module

STEP 2. Verify that the TB CALLING annunciator becomes illuminated

STEP 3. Disconnect the Function Generator

STEP 4. On the Master module, select REH and verify that the REH annunciator becomes illuminated

STEP 5. Select ON AIR and verify that the ON AIR annunciator becomes illuminated. Clear the ON AIR annunciator by pressing ON AIR while holding the CLR switch.

STEP 6. Select PFL on any module, and verify that the PFL/SOLO annunciator becomes illuminated

STEP 7. On the Monitor module, select MON and verify that the CONTROL L.S. MUTE and STUDIO L.S. MUTE annunciators become illuminated. Clear these annunciators by selecting MON a second time

STEP 8. Replace the plex panel on the Meter Housing

5.5.5 Clock Adjustment and Setting

The Meter Housing clock is set at the keypad on the Clock Board (CLK) which is located at the left of the Meter Housing as seen from the rear. The keypad is made up of 16 discrete pushbutton switches, these being identified directly on the switches.

Before setting the Clock, the frequency of the Clock oscillator should be checked and, where necessary, adjusted.

5.5.5.1 Oscillator Frequency

STEP 1. Connect the Frequency Counter between TP5 and ground

STEP 2. Adjust C19 so that the Frequency Counter indication becomes 37768.0 ± 0.01 Hz

STEP 3. Disconnect the Frequency Counter

5.5.5.2 Clock Setting

STEP 1. Set the Power Supply switch to ON

STEP 2. In the sequence listed, press the following switches on the keypad:

RESET; T/C; T/C; SET

STEP 3. Using the numeric keys, enter the time as a six-digit number in HH:MM:SS format (leading zeroes are required)

STEP 4. Press SET to validate and set the time

STEP 5. Repeat STEP 2

STEP 6. Press the DAY key repeatedly until the correct day is displayed on the clock

STEP 7. Press SET to validate and set the day

5.6 INPUT/OUTPUT MODULE

Paragraphs 5.6.1 through 5.6.3 describe the tests and adjustments for a single I/O module. They should be repeated for every I/O module in the console.

5.6.1 VCA and Pan Buffer Gain

STEP 1. Set the Power Supply switch to OFF and remove the I/O module from the console

STEP 2. Connect a wire link between pin 7 (PATCH SEND) and pin 36 (PATCH RETURN) on the I/O module input/output connector

STEP 3. Reinstall the I/O module on the extender card, and set the power supply switch back to ON. Verify that the I/O module controls are set in accordance with the setup given in paragraph 5.3.5

STEP 4. Set the Function Generator to supply a 1000 Hz, +4 dBm sine wave and connect its output to the LINE INPUT on the I/O module. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 5. Connect the AC Voltmeter between analog ground and TP7

STEP 6. Adjust the Input Level Trim control so that the AC Voltmeter indication becomes −10 dBu

STEP 7. Connect the AC Voltmeter between analog ground and TP6

STEP 8. Set the Channel Fader to 12 dB (fully up) and adjust RV2 on the VCA card so that the AC Voltmeter indication becomes +6 ±0.2 dBu

STEP 9. Connect the AC Voltmeter between analog ground and TP1 and verify that the Channel PAN control is set to the detent position. Adjust RV16 so that the AC Voltmeter indication becomes +6 dBu ± 0.1 dB

STEP 10. Connect the AC Voltmeter between analog ground and TP2. Adjust RV17 so that the AC Voltmeter indication becomes +6 dBu ±0.1 dB

STEP 11. Set the Channel Fader to exactly 0 dB and verify that the AC Voltmeter indicator becomes −6 dBu

STEP 12. Disconnect the Function Generator and AC Voltmeter from the I/O module

5.6.2 VCA Distortion

STEP 1. Set the Oscillator section on the Distortion Analyzer to supply a 1000 Hz, 0 dBm sine wave with 600 ohm source impedance and balanced output

STEP 2. Connect the Distortion Analyzer Oscillator output to the LINE INPUT on the I/O module. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 3. On the Analyzer section of the Distortion Analyzer, set the INPUT RANGE switch to AUTO RANGE, and press the AUTO RANGE switch

STEP 4. Also on the Analyzer section, select RMS response, Audio Band Pass Filter, and 600 ohms

STEP 5. Connect the Analyzer section between analog ground and TP6 on the I/O module

STEP 6. Press THD+N on the Distortion Analyzer and adjust RV1 on the VCA so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, the VCA Gain adjustment procedure (STEP 4 through STEP 8 of paragraph 5.6.1) should be repeated.

STEP 7. Disconnect both sections of the Distortion Analyzer

5.6.3 Peak Indicator

Use the following procedure to set the PEAK indicator threshold:

STEP 1. Set the Function Generator to supply a 1000 Hz, 0 dBu sine wave and connect its output to the LINE INPUT on the I/O module. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 2. Verify that the Pan control on the I/O module is centered, and select MIX (just below and to the Right of the PAN control)

STEP 3. Set the module Fader so that the LEFT/RIGHT meters indicate 0 VU

STEP 4. Set the Function Generator output level to +8 dBu

STEP 5. Adjust RV9 so that the PEAK indicator extinguishes, then advance RV9 until the indicator just becomes illuminated

STEP 6. Set the Power Supply switch to OFF, disconnect all test equipment, and reinstall the I/O module in the console

5.7 COMMUNICATIONS MODULE

The alignment procedures for the Talkback Microphone, Oscillators and Noise Generators on the Communications module are detailed in paragraphs 5.7.1 through 5.7.4 below.

5.7.1 Talkback Microphone

STEP 1. Set the Power Supply switch to OFF and remove the Communications Module from the console

STEP 2. Reinstall the module on the extender, and set the Power Supply switch to ON

STEP 3. Disconnect the Talkback miocrophone harness from CNJ3

STEP 4. Set the Function Generator to supply a 1000 Hz, −50 dBm signal, and connect it between analog ground and pin 3 on CNJ3. (Pin 3 corresponds to the blue wire on the microphone harness)

STEP 5. Connect the AC Voltmeter between TP2 and analog ground

STEP 6. Press and hold EXT 1 on the Communications module panel

STEP 7. Adjust RV4 on the Communications module so that the AC Voltmeter indication becomes −6 dBu

STEP 8. Disconnect the test equipment and reconnect the Talkback Microphone wiring to CNJ3

5.7.2 Slate Oscillator

STEP 1. Connect the Frequency Counter between TP3 and analog ground

STEP 2. Set RV5 fully clockwise, and verify that the Frequency Counter indication is 17 Hz ±1 Hz. Disconnect the Frequency Counter

STEP 3. Connect the AC Voltmeter between TP3 and analog ground

STEP 4. Adjust RV5 so that the AC Voltmeter indication becomes −20 dBu

5.7.3 Test Oscillator

5.7.3.1 Oscillator Frequency

STEP 1. Set Oscillator FREQ control fully CCW and select the x1 multiplier

STEP 2. On the Master module, set the Master Fader to 0 dB (fully up)

STEP 3. On the Communications module, set the OSCILLATOR to ON, and select MIX on the ASSIGNMENT section

STEP 4. On the input/output connector for the Master module, connect the Frequency Counter between pins 12 (MIX A LEFT HIGH) and 41 (MIX A LEFT LOW)

STEP 5. Set the Oscillator FREQ and multiplier controls to the positions listed in Table 5-2. The Frequency Counter indications should be within ±10% of those specfifed in the table

SELECTED MULTIPLIER	FREQ CONTROL POSITION		
	FULLY CCW	DETENT	FULLY CW
x1	12 Hz	87 Hz	165 Hz
x10	120 Hz	870 Hz	1.65 kHz
x100	1.2 kHz	8.7 kHz	16.5 kHz

Table 5-2. Oscillator Frequencies

NOTE: It may be necessary to set RV3 on the Communications module fully CW to attain sufficient drive for the Frequency Counter.

5.7.3.2 Oscillator Level

STEP 1. Set the Communications module OSC LEVEL and FREQ controls to their detent positions

STEP 2. On the Master module, set the Master Fader to 0 dB (fully up)

STEP 3. On the Communications module, set the OSCILLATOR to ON, and select MIX on the ASSIGNMENT section

STEP 4. On the input/output connector for the Master module, connect the AC Voltmeter between pins 12 (MIX A LEFT HIGH) and 41 (MIX A LEFT LOW)

STEP 5. Adjust RV3 on the Communications module so that the AC Voltmeter indication becomes 0 dBu ± 0.2 dB

5.7.4 Noise Generators

STEP 1. On the ASSIGNMENT section of the Communications module, select GPS and deselect MIX

STEP 2. Set the OSC LEVEL control to the detent position

STEP 3. On the OSCILLATOR section, verify that the Oscillator is ON, and select WHT (white noise)

STEP 4. Adjust RV7 on the Communications module so that the Group Meters indicate −5 VU

STEP 5. On the OSCILLATOR section, select PINK. Verify that the Group meters give a fluctuating indication at approximately −5 VU

STEP 6. Set the Power Supply switch to OFF, disconnect all test equipment, and reinstall the Communications in the console

5.8 MONITOR MODULE ADJUSTMENTS

The only adjustment required for the Monitor module is that for the incoming Talkback threshold. The adjustment procedure is detailed below.

STEP 1. Set the Power Supply switch to OFF and remove the Monitor module from the console

STEP 2. Reinstall the module on the extender card, and set the power supply switch back to ON. Verify that the module controls are set in accordance with the setup given in paragraph 5.3.2

STEP 3. Set the Power Supply switch to ON

STEP 4. Set the Function Generator to supply a 1000 Hz, −12 dBm sine wave and connect its output between pins 8 (high) and 37 (low) on the Communications module input/output connector

STEP 5. Adjust RV4 on the Monitor module until the TB CALLING annunciator on the Meter Housing extinguishes, then advance RV4 to the point where the annunciator just becomes illuminated

STEP 6. Set the Power Supply switch to OFF, disconnect all test equipment, and reinstall the Monitor in the console

5.9 MASTER MODULE

The two VCAs On the Master module are adjusted in a manner similar to that in the I/O module.

5.9.1 VCA GAIN

STEP 1. Set the Power Supply switch to OFF and remove the Master module from the console

STEP 2. Reinstall the module on the extender card, and set the power supply switch back to ON. Verify that the module controls are set in accordance with the setup given in paragraph 5.3.3

STEP 3. On the Communications module, set the OSCILLATOR to ON, set the FREQ control to the detent position, and select the x10 multiplier

STEP 4. Also on the Communications module, select MIX on the ASSIGNMENT section

STEP 5. On the Master module, connect the AC Voltmeter between analog ground and TP7

STEP 6. On the Communications module, set the OSC LEVEL control so that the AC Voltmeter indicator becomes 0 dBu

STEP 7. On the Master module, set the Fader to 12 dB and move the AC Voltmeter probe to TP9

STEP 8. Adjust RV2 on VCA 1 so that the AC Voltmeter indication becomes -12 dBu ± 0.1 dB

STEP 9. Move the AC Voltmeter probe to TP8, and adjust the OSC LEVEL control on the Communications module so that the AC Voltmeter indication becomes 0 dBu

STEP 10. Move the AC Voltmeter probe to TP10, and adjust RV2 on VCA2 so that the AC Voltmeter indication becomes −12 dBu ± 0.1 dB

STEP 11. On the Communications module, set the OSCILLATOR to OFF

5.9.2 VCA Distortion

STEP 1. Connect a wire link between pin 7 (PATCH SEND) and pin 36 (PATCH RETURN) on the input/output connector for any I/O module

STEP 2. On the same I/O module, verify that the Channel PAN control is set to the detent position and select the MIX switch (just below and to the right of the PAN control)

STEP 3. Set the Oscillator section on the Distortion Analyzer to supply a 1000 Hz, 0 dBm sine wave with 600 ohm source impedance and balanced output

STEP 4. Connect the Distortion Analyzer Oscillator output to the LINE INPUT on the I/O module. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 5. On the Analyzer section of the Distortion Analyzer, set the INPUT RANGE switch to AUTO RANGE, and press the AUTO RANGE switch

STEP 6. Also on the Analyzer section, select RMS response, Audio Band Pass Filter, and 600 ohms

STEP 7. Connect the Analyzer section between analog ground and TP9 on the Master module

STEP 8. Press THD+N on the Distortion Analyzer and adjust RV1 on VCA 1 so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, on VCA 1, the VCA Gain adjustment procedure (STEP 5 through STEP 8 of paragraph 5.9.1) should be repeated.

STEP 9. Connect the Analyzer section between analog ground and TP10 on the Master module

STEP 10. Press THD+N on the Distortion Analyzer and adjust RV1 on VCA 2 so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, on VCA 2, the VCA Gain adjustment procedure (STEP 3 through STEP 6, STEP 9 and STEP 10 of paragraph 5.9.1) should be repeated.

STEP 11. Disconnect the Distortion Analyzer, set the Power Supply switch to OFF, and reinstall the Master module in the console. Remove the wire link from the I/O module input/output connector

5.10 GROUP MODULE ADJUSTMENTS

The adjustments given in the following paragraphs are for a single Group module, and should be repeated for each module in the console.

5.10.1 VCA Gain

STEP 1. Set the Power Supply switch to OFF and remove the Group module from the console

STEP 2. Install a wire link between pins 7 (GROUP PATCH SEND) and 36 (GROUP PATCH RETURN) on the Group modules input/output connector

STEP 3. Reinstall the Group module on the extender card, and set the Power Supply switch back to ON. Verify that the module controls are set in accordance with the setup given in paragraph 5.3.4

STEP 4. Set the Function Generator to supply a 1000 Hz, +4 dBm sine wave and connect its output to the LINE INPUT on any I/O module. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 5. Install a wire link between pins 7 (PATCH SEND) and 36 (PATCH RETURN) on the same I/O module selected in STEP 4

STEP 6. On the selected I/O module, set the Channel PAN control to the center (detent) position and select 1-2 or 3-4 (just below the PAN control) in accordance with the Group module under test

STEP 7. On the Group module, connect the AC Voltmeter between analog ground and TP4

STEP 8. On the I/O module, adjust the Input Level Trim control so that the AC Voltmeter indication becomes 0 dBu

STEP 9. Connect the AC Voltmeter between analog ground and TP5 on the Group module

STEP 10. Set the Group LEVEL (rotary Fader) control to the center position and adjust RV2 on the VCA card so that the AC Voltmeter indication becomes −12 dBu ± 0.2 dBu

STEP 11. Set the Group LEVEL control fully CW and verify that the AC Voltmeter indication becomes 0 dBu ± 0.2 dBu

STEP 12. Disconnect the Function Generator and the AC Voltmeter

5.10.2 VCA Distortion

STEP 1. Remove JW31 or JW32 (whichever is installed) from the Group module

STEP 2. Set the Oscillator section on the Distortion Analyzer to supply a 1000 Hz, 0 dBm sine wave with 600 ohm source impedance and balanced output

STEP 3. Connect the Distortion Analyzer Oscillator output to TP4 on the Group module.

STEP 4. On the Analyzer section of the Distortion Analyzer, set the INPUT RANGE switch to AUTO RANGE, and press the AUTO RANGE switch

STEP 5. Also on the Analyzer section, select RMS response, Audio Band Pass Filter, and 600 ohms

STEP 6. Connect the Analyzer section between analog ground and TP5 on the Group module

STEP 7. Press THD+N on the Distortion Analyzer and adjust RV1 on the VCA card so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, the VCA Gain adjustment procedure (STEP 4 through STEP 11 of paragraph 5.10.1) should be repeated.

STEP 8. Reinstall JW31 or JW32

STEP 9. Disconnect both sections of the Distortion Analyzer and remove the wire links from the Group module and I/O module input/output connectors

5.11 STEREO INPUT MODULE

Paragraphs 5.11.1 through 5.11.3 describe the tests and adjustments for a single Stereo Input module. They should be repeated for every Stereo Input module in the console.

5.11.1 VCA Gain

STEP 1. Set the Power Supply switch to OFF and remove the Stereo Input module from the console

STEP 2. Reinstall the module on the extender card, and set the Power Supply switch back to ON. Verify that the module controls are set in accordance with the setup given in paragraph 5.3.6

STEP 3. Set the Function Generator to supply a 1000 Hz, +4 dBm sine wave and connect its output between pins 16 (INPUT 1 L HIGH) and 45 (INPUT 1 L LOW) on the input/output connector for the Stereo Input module.

STEP 4. Connect the AC Voltmeter between analog ground and TP8

STEP 5. Adjust the Input Level Trim control so that the AC Voltmeter indication becomes −10 dBu

STEP 6. Transfer the AC Voltmeter probe to TP4

STEP 7. Set the Channel Fader to +12 dB and adjust RV2 on VCA 1 so that the AC Voltmeter indication becomes +6 dBu ± 0.2 dB

STEP 8. Transfer the AC Voltmeter probe to TP10

STEP 9. Set the Function Generator to supply a 1000 Hz, +4 dBm sine wave and connect its output between pins 13 (INPUT 1 R HIGH) and 42 (INPUT 1 R LOW) on the input/output connector for the Stereo Input module.

STEP 10. Adjust the Input Level Trim control so that the AC Voltmeter indication becomes −10 dBu

STEP 11. Transfer the AC Voltmeter probe to TP3

STEP 12. Set the Channel Fader to +12 dB and adjust RV2 on VCA 2 so that the AC Voltmeter indication becomes +6 dBu ± 0.2 dB

STEP 13. Disconnect the AC Voltmeter and the Function Generator

5.11.2 VCA Distortion

STEP 1. Set the Oscillator section on the Distortion Analyzer to supply a 1000 Hz, 0 dBm sine wave with 600 ohm source impedance and balanced output

STEP 2. Connect the Distortion Analyzer Oscillator between pins 16 (INPUT 1 L HIGH) and 45 (INPUT 1 L LOW) on the input/output connector for the Stereo Input module.

STEP 3. On the Analyzer section of the Distortion Analyzer, set the INPUT RANGE switch to AUTO RANGE, and press the AUTO RANGE switch

STEP 4. Also on the Analyzer section, select RMS response, Audio Band Pass Filter, and 600 ohms

STEP 5. Connect the Analyzer section between analog ground and TP4 on the Stereo Input module

STEP 6. Press THD+N on the Distortion Analyzer and adjust RV1 on VCA 1 so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, repeat the VCA Gain adjustment procedure (STEP 3 through STEP 7 of paragraph 5.11.1)

STEP 7. Connect the Distortion Analyzer Oscillator between pins 13 (INPUT 1 R HIGH) and 42 (INPUT 1 R LOW) on the input/output connector for the Stereo Input module. Verify that the settings are the same as those given in STEP 1

STEP 8. Connect the Analyzer section between analog ground and TP3 on the Stereo Input module. Verify that the settings are the same as those given in STEP 3 and STEP 4

STEP 9. Press THD+N on the Distortion Analyzer and adjust RV1 on VCA 2 so as to minimize the THD indication on the Distortion Analyzer

NOTE: If any significant adjustment is made to RV1, repeat the VCA Gain adjustment procedure (STEP 8 through STEP 12 of paragraph 5.11.1)

STEP 10. Disconnect both sections of the Distortion Analyzer

5.11.3 Peak Indicator

Use the following procedure to set the PEAK indicator threshold:

STEP 1. Set the Function Generator to supply a 1000 Hz, 0 dBm sine wave and connect its output between pins 16 (INPUT 1 L HIGH) and 45 (INPUT 1 L LOW) on the input/output connector for the Stereo Input module.

STEP 2. Verify that the Pan control on the Stereo Input module is centered, and select MIX (just below and to the Right of the PAN control)

STEP 3. Set the module Fader so that the LEFT meter indicates 0 VU

STEP 4. Set the Function Generator output level to +8 dBm

STEP 5. Adjust RV12 so that the PEAK indicator extinguishes, then advance RV12 until the indicator just becomes illuminated

STEP 6. Set the Power Supply switch to OFF, disconnect all test equipment, and reinstall the Stereo Input module in the console

5.12 DYNAMICS MODULE

The results of the Dynamics module tests depend upon the state of previous adjustments, and it is essential to ensure that the I/O modules and MIX meters have been set up correctly before carrying out the following procedures

5.12.1 Initial Setup

STEP 1. Set the Power Supply switch to OFF and remove the Dynamics module from the console

STEP 2. Connect a wire link between pins 7 (PATCH SEND) and 36 (PATCH RETURN) on the input/output connector for any I/O module

STEP 3. Reinstall the Dynamics module on the extender card, and set the Power Supply switch back to ON.

STEP 4. Set the Function Generator to supply a 1000 Hz, 0 dBm sine wave and connect its output to the LINE INPUT on the I/O module selected in STEP 2. For the standard I/O module, the input/output connector pins are 13 (high) and 42 (low)

STEP 5. On the I/O module, verify that the channel PAN control is set to the center position, and select MIX (just below and to the right of the PAN control). Verify that the Input Level Trim control is set fully CW

STEP 6. Connect the AC Voltmeter to pins 7/36 on the I/O module's input/output connector

STEP 7. On all Dynamics module channels, set the COMPRESSOR THRESH, LIMITER THRESH, RATIO controls fully CW

STEP 8. Also on the Dynamics module, set all COMPRESSOR ATTACK and COMPRESSOR RELEASE controls to N

5.12.2 Limiters

STEP 1. On the I/O module, set the DYNAMIC thumbwheel switch to 1

STEP 2. On Dynamics module channel 1, set the LIMITER to ON and the COMPRESSOR to OFF. Verify that the Compressor indicator is extinguished and the Limiter indicator is illuminated

STEP 3. Slowly adjust the LIMITER THRESH control CCW until the indications on the LEFT and RIGHT meters fall to 0 VU

STEP 4. Adjust the Function Generator output level so that the AC Voltmeter indication becomes +20 dBu

STEP 5. Adjust RV107 on the Dynamics module so that the LEFT and RIGHT meter indications become +1 VU

STEP 6. Repeat STEP 1 through STEP 5 with the settings and adjustments listed in Table 5-3

I/O DYNAMIC SWITCH (STEP 1)	DYNAMICS CHANNEL (STEP 2)	ADJUSTING CONTROL (STEP 5)
2	2	RV207
3	3	RV307
4	4	RV407

Table 5-3. Limiter Adjustments

5.12.3 Compressors

STEP 1. On the I/O module, set the DYNAMIC thumbwheel switch to 1

STEP 2. On Dynamics module channel 1, set the LIMITER to OFF and the COMPRESSOR to ON.

STEP 3. Set the Function Generator so that the AC Voltmeter indication becomes 0 dBu

STEP 4. Set the module Fader so that the LEFT AND RIGHT meter indications become 0 VU

STEP 5. Adjust the COMPRESSOR THRESH control so that the LEFT and RIGHT meter indications become 0 VU. Note that the indications may initially increase

STEP 6. Adjust the Function Generator output level so that the AC Voltmeter indication becomes +20 dBu

STEP 7. Adjust RV108 on the Dynamics module so that the GAIN REDUCTION indication becomes 16 dB

STEP 8. Repeat STEP 1 through STEP 5 with the settings and adjustments listed in Table 5-4

I/O DYNAMIC SWITCH (STEP 1)	DYNAMICS CHANNEL (STEP 2)	ADJUSTING CONTROL (STEP 6)
2	2	RV208
3	3	RV308
4	4	RV408

Table 5-4. Compressor Adjustments

STEP 9. Disconnect the test equipment, set the Power Supply switch to OFF, and reinstall the Dynamics module in the console. Remove the wire link from the I/O module's input/output connector

SECTION 6
ENGINEERING DRAWINGS

6.1 INTRODUCTION

This section contains all of the parts lists and engineering drawings (exploded views, schematic diagrams and component layouts) related to the **MXP-2000** Series Professional Mixing Consoles.

6.2 ORGANIZATION

The drawings within this section are arranged in the following manner:

Exploded views and associated parts lists:
pages 6-2 through 6-26
Component Layouts and schematic diagrams:
Electrical Parts Lists
pages 6-27 through 6-61
Main Frame Sub-boards
pages 6-62 through 6-73
Module Sub-boards
pages 6-74 through 6-97
Modules pages 6-98 through 6-113
Meter Housing Sub-boards
pages 6-114 through 6-125
Power Supply Sub-boards
pages 6-126 through 6-129

It should be noted that the electrical parts lists are arranged in the same sequence as their associated schematic diagrams.

6.3 PARTS INFORMATION

Because of ongoing factory programs relating to parts improvement and/or standardization, replacement parts supplied from Sony Parts Center may differ in physical appearance from those being replaced. The parts lists within this section provide the part numbers for "genuine standardized parts." Refer to Sony service bulletins and service manual supplements for current information concerning engineering parts changes.

It should be noted that certain parts are seldom, if ever, required for routine service, and these parts are neither stocked nor included in the parts lists. Where such parts are listed (for reference purposes), they are assigned a "U" Service Code as an indication that they are not stock items.

Main Frames and Covers Assembly Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
2000	T-9481-970-1	Main Frame Assy	U
2001	3-642-656-01	Foot (X4)	S
2002	3-673-676-01	Card Guide (X40)	O
2003	7-623-210-22	Washer, Split Lock, M4 (X2)	S
2004	7-682-187-09	Screw, P M6X10 Blk (X8)	S
2005	7-682-268-04	Screw, K M4X30 Crm (X6)	S
2006	7-682-947-01	Screw,+PSW 3X6 Czn (X20)	S
2007	7-683-419-04	Screw, M4X8 Socket Cap (X2)	S
2008	7-686=640-09	Screw, Totsu M4X20 (X4)	S
2009	T-9452-900-2	Rear Beam	O
2010	T-9452-909-6	Lower Left Cosmetic Pnl	O
2011	T-9452-910-6	Lower Right Cosmetic Pnl	O
2012	T-9452-916-7	Upper Right Cosmetic Pnl	O
2013	T-9452-917-7	Upper Left Cosmetic Pnl	O
2014	T-9452-919-1	Armrest (X3)	O
2015	T-9452-920-5	Plate Rear, Vertical	S
2016	T-9452-921-3	Plate Front, Vertical	S
2017	T-9452-Z9601	Screw, M3X8, FH, Allen, Blk (X22)	S
2018	T-9453-448-1	Neck	O
2019	T-9453-449-1	Back Plate	O
2020	T-9453-450-1	Spacer Plate	O
2021	T-9481-887-1	PWA, AEB	O

SERVICE CODES:

S: Stock Parts — normally stocked for replacement purposes

O: Order Parts — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

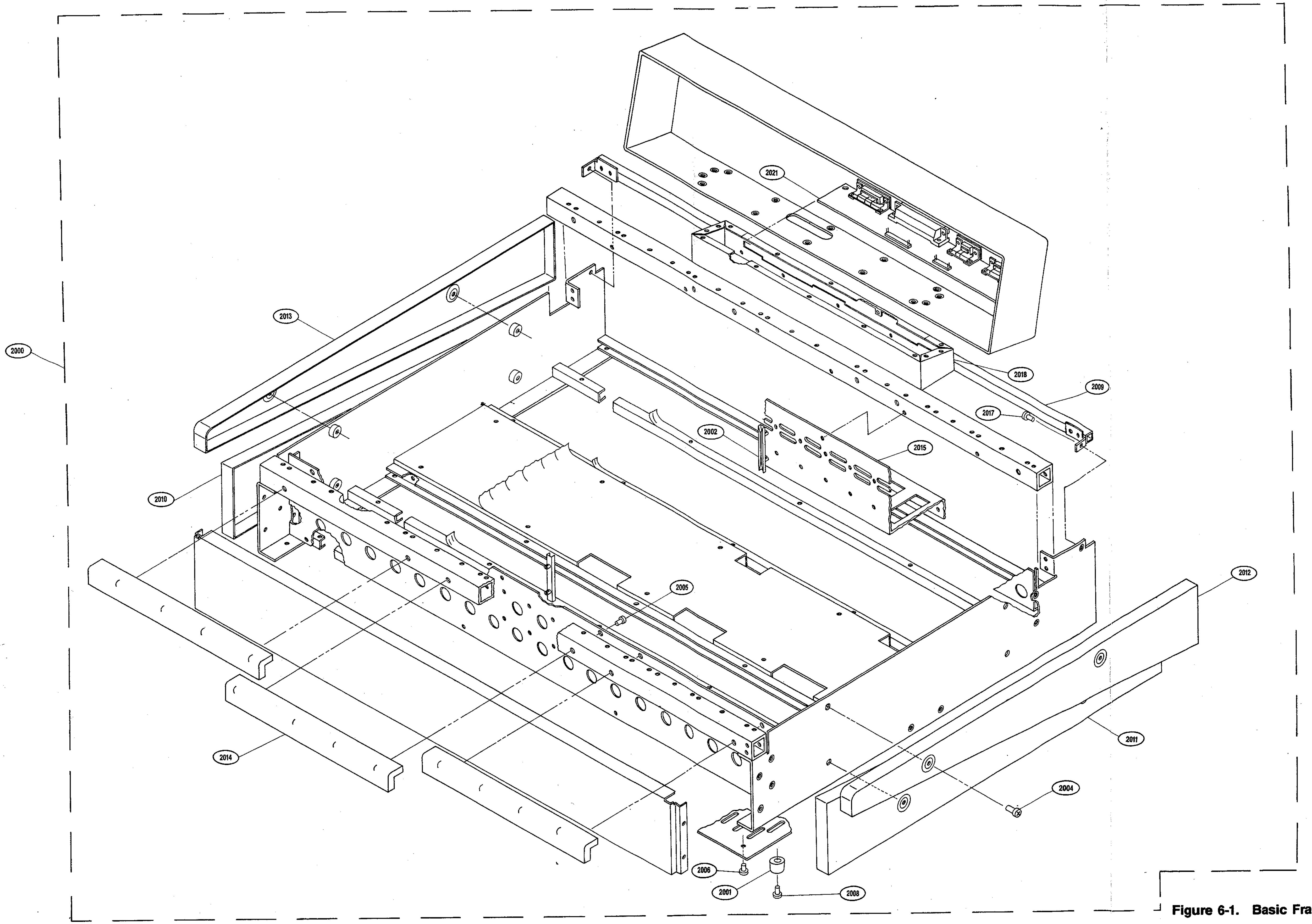
2000
2013
2021
2018
2009
2017
2002
2015
2010
2005
2012
2011
2014
2004
2006
2001
2008

Figure 6-1. Basic Frames and Covers Assembly

Meter Housing Assembly Parts List

VU INSTRUMENT METER HOUSING PARTS LIST

Ref. No.	SONY Part No.	Description	Serv. Code
4000	T-9481-958-2	Panel, VU Inst Meter Housing	U
4001	1-503-291-11	Speaker	S
4002	7-623-207-22	Lock Washer 2.6 (X12)	S
4003	7-623-208-22	Washer, Split Lock M3 (X28)	S
4004	7-623-210-22	Washer,Split Lock M4 (X24)	S
4005	T-9413-545-1	Meter,VU,LG,6V Lamps (X2)	S
4006	T-9413-546-1	Meter,VU,SM,6V Lamps (X2)	S
4007	T-9451-575-1	Gasket, Richco Sngs-2 (3 1/4ft)	O
4008	T-9481-896-2	PWA, PMB	O
4009	T-9481-897-1	PWA, CLK	O
4010	T-9481-898-2	PWA, LDB	O
4011	T-9481-899-1	PWA, DMB	O
4012	T-9481-923-1	PWA, MIB (X6)	U

PPM INSTRUMENT METER HOUSING PARTS LIST

Ref. No.	SONY Part No.	Description	Serv. Code
4000	T-9481-878-2	Panel, PPM Inst Meter Housing	U
4001	1-503-291-11	Speaker	S
4002	7-623-207-22	Lock Washer 2.6 (X12)	S
4003	7-623-208-22	Washer, Split Lock M3 (X28)	S
4004	7-623-210-22	Washer,Split Lock M4 (X24)	S
4005	T-9413-543-1	Meter,PPM,LG,6V Lamps (X2)	S
4006	T-9413-544-1	Meter,PPM,SM,6V Lamps (X2)	S
4008	T-9481-896-2	PWA, PMB	O
4009	T-9481-897-1	PWA, CLK	O
4010	T-9481-898-2	PWA, LDB	O
4011	T-9481-899-1	PWA, DMB	O
4012	T-9481-895-1	PWA, PPM (X6)	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

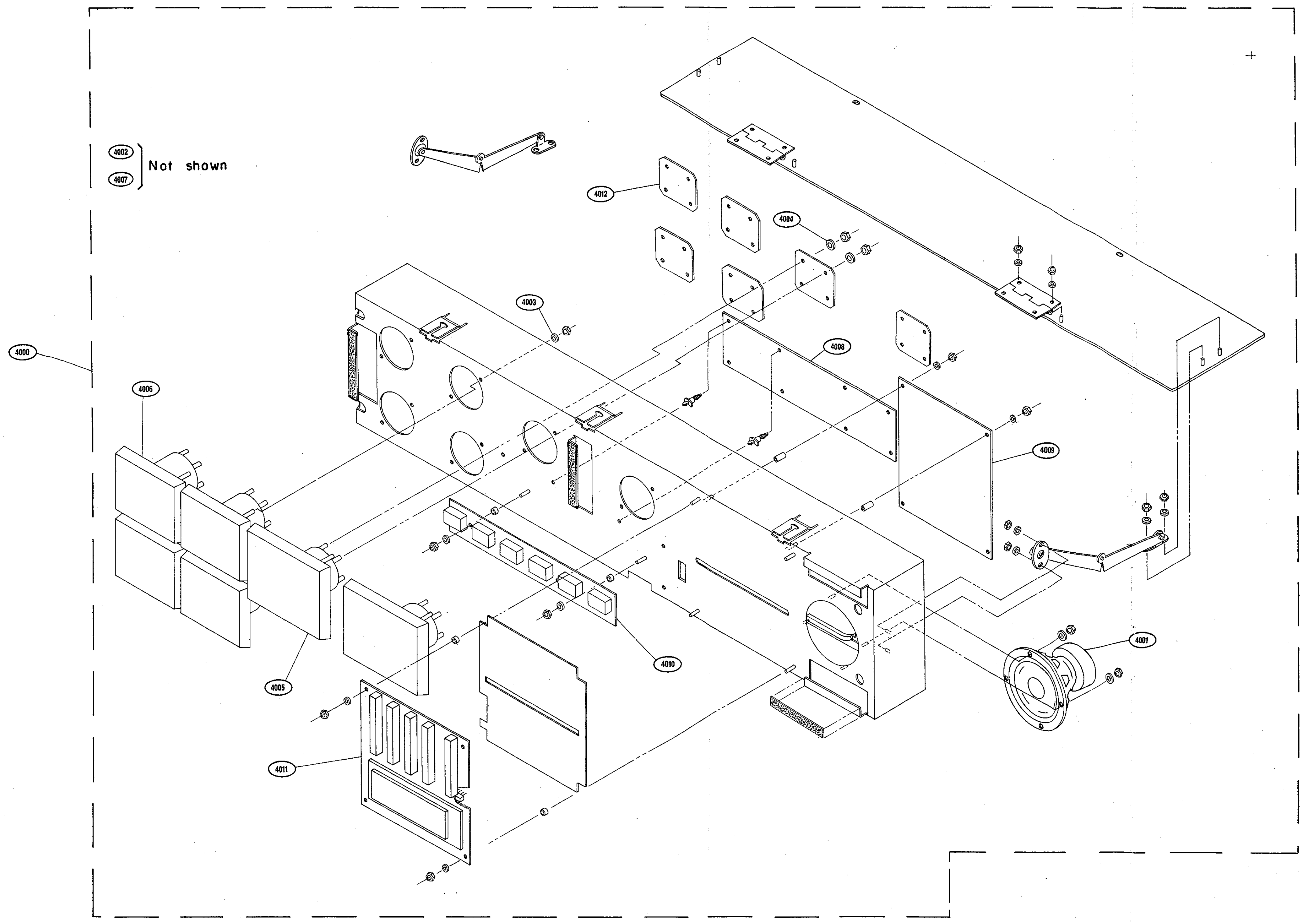
4002
4007
Not shown
4000
4012
4004
4003
4008
4006
4009
4010
4005
4001
4011

Figure 6-2. Meter Housing Assembly

Instrument Case Assembly Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
3000		Instrument Case Assembly	U
3001	T-9481-959-1	Meter Housing Plex Assembly	O
3002	3-672-268-01	SONY Logo	O
3003	T-9453-448-1	Neck	O
3004	T-9453-449-1	Back Plate	O
3005	T-9453-450-1	Spacer Plate	O
3006	T-9452-900-1	Rear Beam	O

SERVICE CODES:
S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

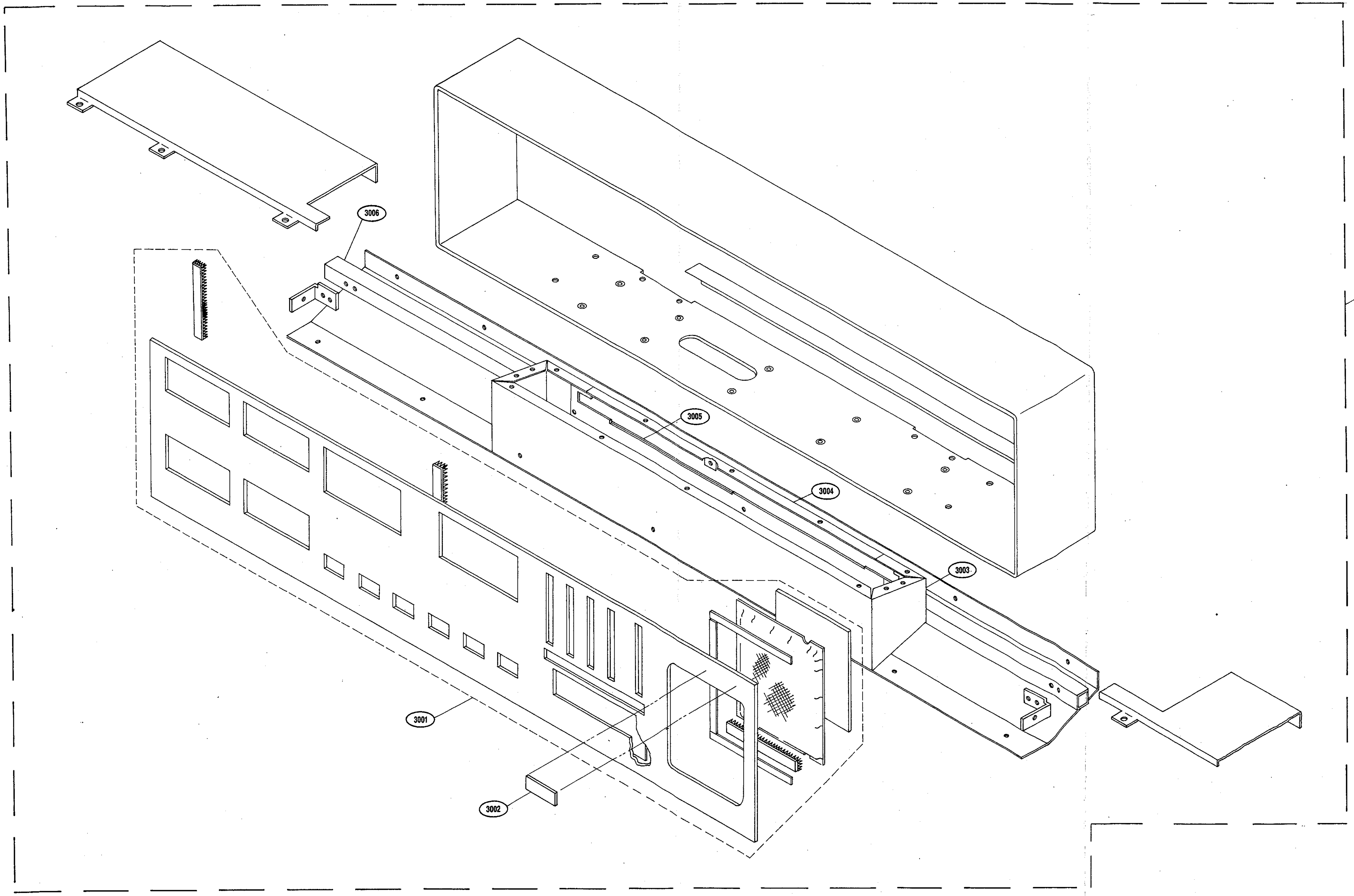
3006
3000
3005
3004
3003
3001
3002

Figure 6-3. Instrument Case Assembly

Mother Board Locator Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
6000		Mother Board Location	U
6001	T-9481-918-1	Mother Board A	U
6003	T-9481-919-1	Mother Board B	U
6004	7-683-419-04	Screw, +PSW 3x6 (x20)	S

SERVICE CODES:
S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

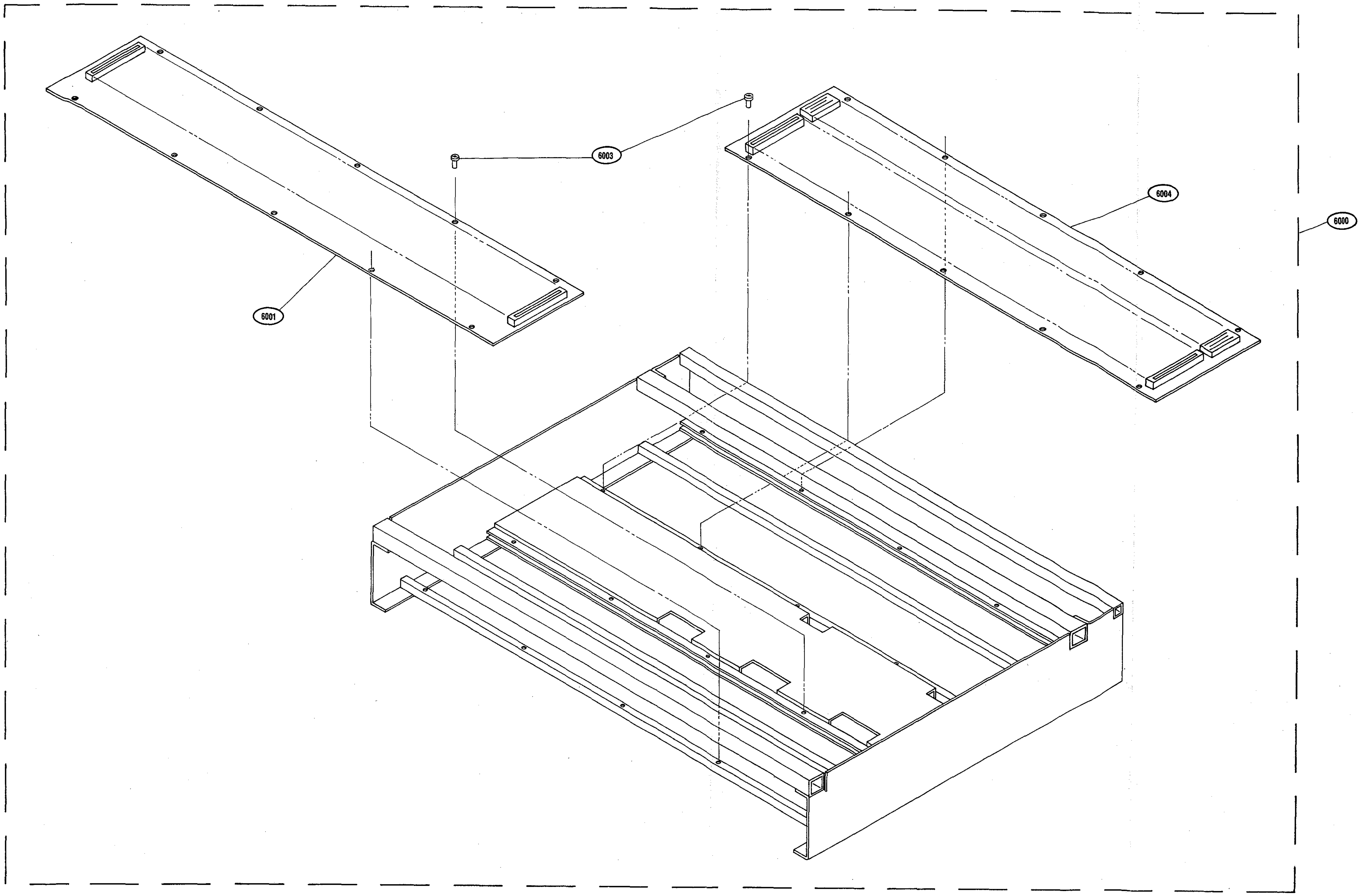
6003
6004
6000
6001

Figure 6-4. Mother Board Locator Diagram

Master Module Mechanical Assembly (SOM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
7000	T-9481-962-1	Master Module Mech. Assembly	O
7001	3-701-439-11	Washer (x2)	S
7002	7-682-248-04	Screw, Csk, M3x8 (x4)	S
7003	T-9413-687-1	LED Module, 12mm, Red	O
7004	T-9413-688-1	LED Module, 12mm, Green	O
7005	T-9451-577-2	Spacer, PCB (x4)	S
7006	T-9451-698-1	Cap, 15mm, Grey (x2)	S
7007	T-9452-424-1	Button, "MUTE" (x3)	S
7008	T-9452-516-1	Button, "SEP"	S
7009	T-9452-523-1	Button, "CLR"	S
7010	T-9452-814-1	Screw, 4-40x1/4	S
7011	T-9452-887-1	Knob, 15mm, 1/8 Shaft, Dk Grey	S
7012	T-9452-889-1	Knob, Fader, 11mm, Red	S
7013	T-9453-170-1	Cap, "ON AIR"	S
7014	T-9453-175-1	Cap, "REH"	S
7015	T-9453-182-1	Cap, 11mm, Green	S
7016	T-9453-183-1	Cap, 17mm, Blue	S
7017	T-9453-257-1	Knob, Top, Dk Grey	S
7018	T-9453-258-1	Knob, Bottom, Dk Grey	S
7019	T-9481-960-1	Function Switch Assembly, 12mm (x2)	O
7020	T-9481-967-2	Fader Assembly, IAM	S
7021	T-9451-595-3	Standoff, Modified (x2)	S
7022	T-9452-959-2	Screw, 6-32x3/8 (x2)	S
7023	T-9481-916-2	Printed Wiring Assembly, VCA (x2)	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

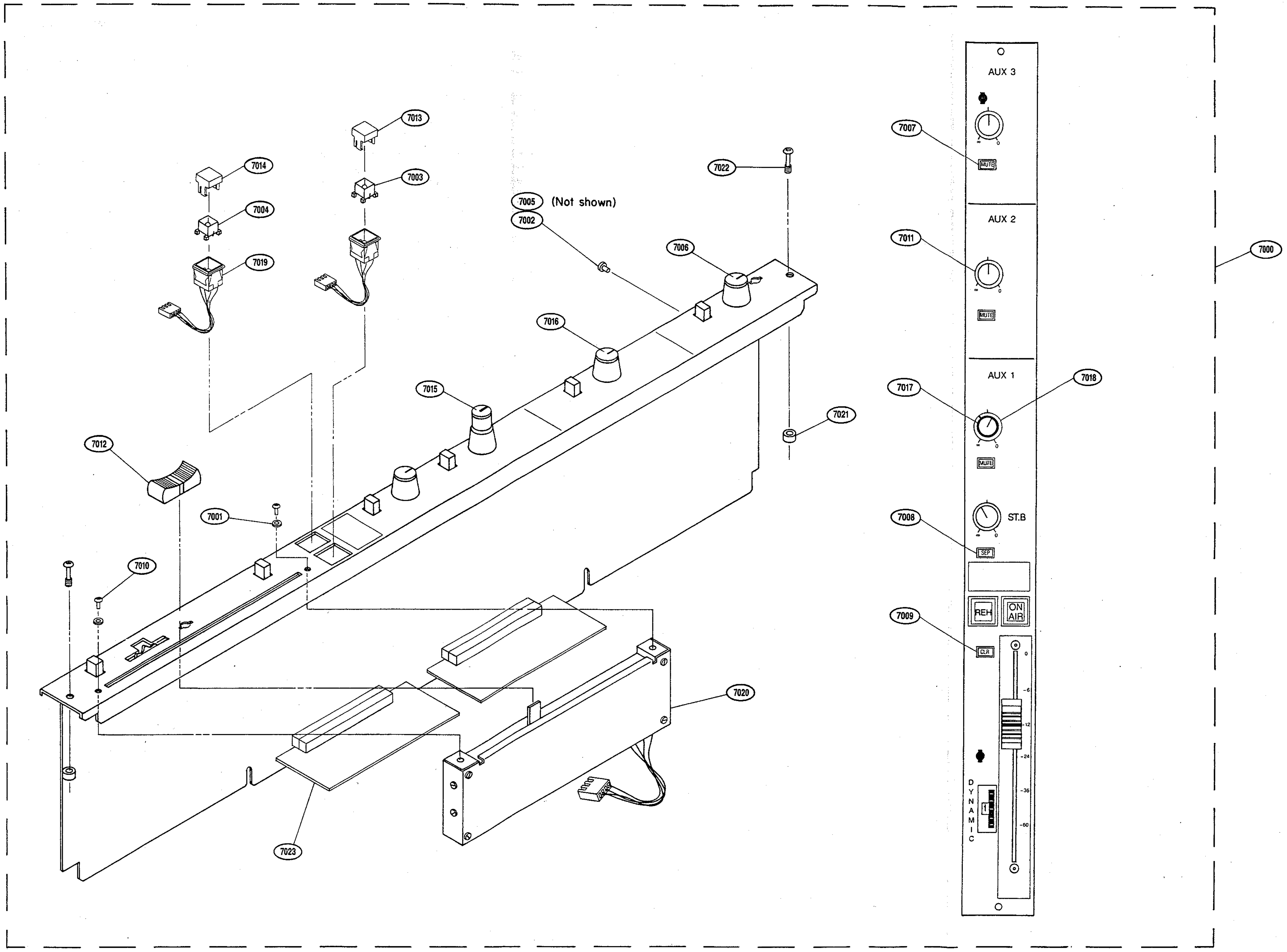
7013
7014
7003
7004
7019
7005 (Not shown)
7002
7022
7006
7016
7015
7012
7001
7010
7021
7020
7023
7000
7007
AUX 3
MUTE
7011
AUX 2
MUTE
7017
7018
AUX 1
MUTE
7008
ST.B
SEP
REH
ON AIR
7009
CLR
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Figure 6-5. Master Module (SOM) Mechanical Assembly

Monitor Module (MMM) Parts List

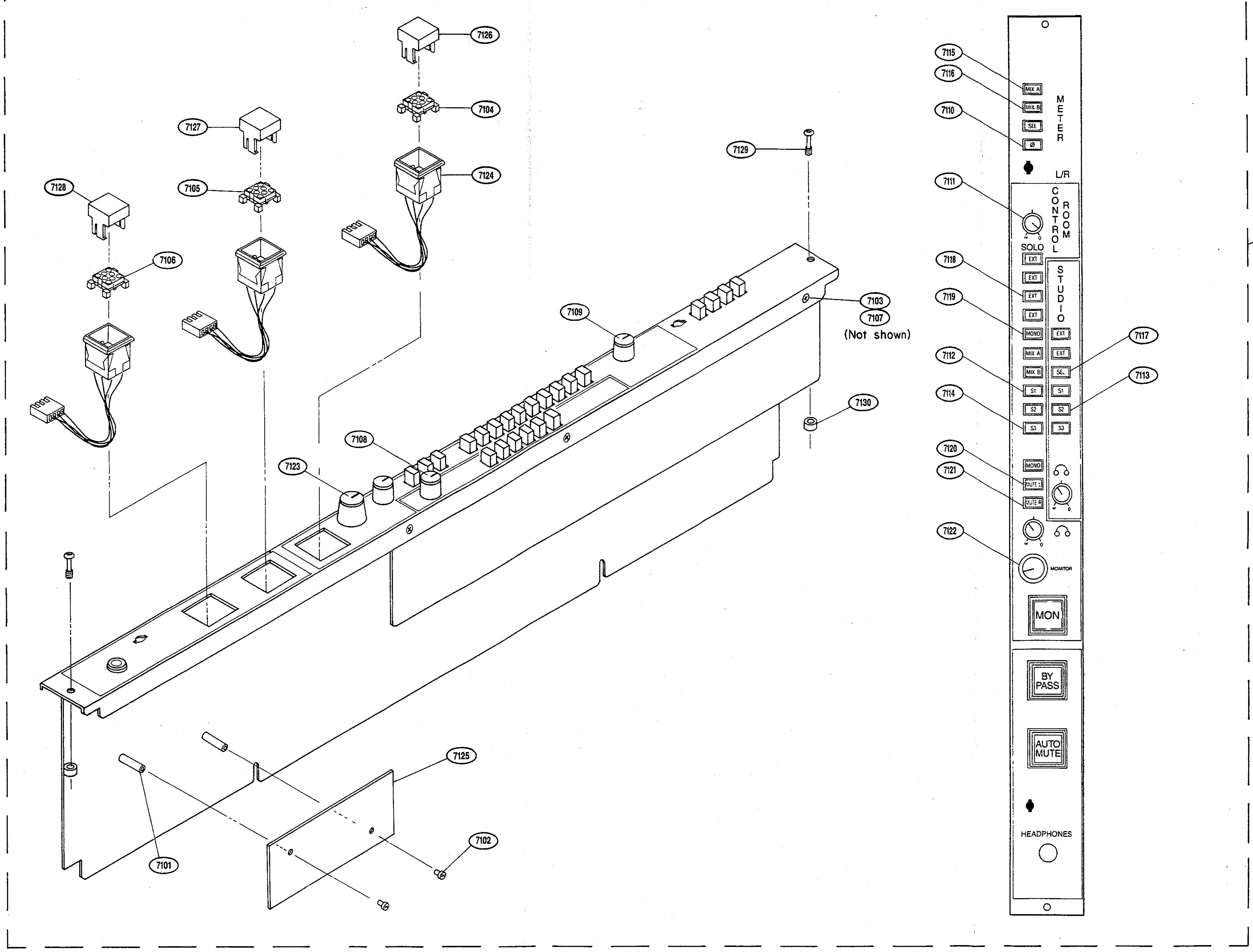
Ref. No.	SONY Part No.	Description	Serv. Code
7100	T-9481-961-1	Monitor Module Mechanical Assembly	O
7101	3-160-430-01	Standoff, 29.8mm, M3xM3 (x2)	O
7102	7-682-147-01	Screw, Phillips, M3x6 (x4)	S
7103	7-682-248-04	Screw, Csk, M3x8 (x7)	S
7104	T-9413-684-1	LED Module, 17MM, Yel	O
7105	T-9413-685-1	LED Module, 17MM, Red	O
7106	T-9413-686-1	LED Module, 17MM, Grn	O
7107	T-9451-577-2	Spacer, PCB	S
7108	T-9451-694-1	Cap, 10mm, Blue (x2)	S
7109	T-9451-701-1	Cap, 10mm, Grey	S
7110	T-9452-416-1	Button, "ø"	S
7111	T-9452-463-1	Knob, 10mm, 1/8 Shaft (x3)	S
7112	T-9452-519-1	Button, "S1" (x2)	S
7113	T-9452-520-1	Button, "S2" (x2)	S
7114	T-9452-521-1	Button, "S3" (x2)	S
7115	T-9452-524-1	Button, "MIX A" (x2)	S
7116	T-9452-525-1	Button, "MIX B" (x2)	S
7117	T-9452-526-1	Button, "SEL" (x2)	S
7118	T-9452-527-1	Button, "EXT" (x6)	S
7119	T-9452-528-1	Button, "MONO" (x2)	S
7120	T-9452-529-1	Button, "MUTE L"	S
7121	T-9452-530-1	Button, "MUTE R"	S
7122	T-9452-887-1	Knob, 15mm, 1/8 Shaft, Dk Grey	S
7123	T-9453-138-1	Cap, 15mm, Dk Grey	S
7124	T-9481-888-1	MG Function Switch Assembly	O
7125	T-9481-909-2	Printed Wiring Assembly, MML	O
7126	T-9453-167-1	Button, "MON"	S
7127	T-9453-168-1	Button, "BYPASS"	S
7128	T-9453-169-1	Button, "AUTO MUTE"	S
7129	T-9452-959-2	Screw, BTHD, 6-32x3/8 (x2)	S
7130	T-9451-595-3	Standoff, Modified	S

SERVICE CODES:

S: Stock Parts — normally stocked for replacement purposes

O: Order Parts — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked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MIX A
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EXT
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MONO
MIX A
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S1
S2
S3
STUDIO
EXT
EXT
SEL
S1
S2
S3
MONO
MUTE L
MUTE R
MONITOR
MON
BY PASS
AUTO MUTE
HEADPHONES

Figure 6-6. Monitor Module (MMM) Mechanical Assembly

Communications Module (COM) Mechanical Assembly Parts List

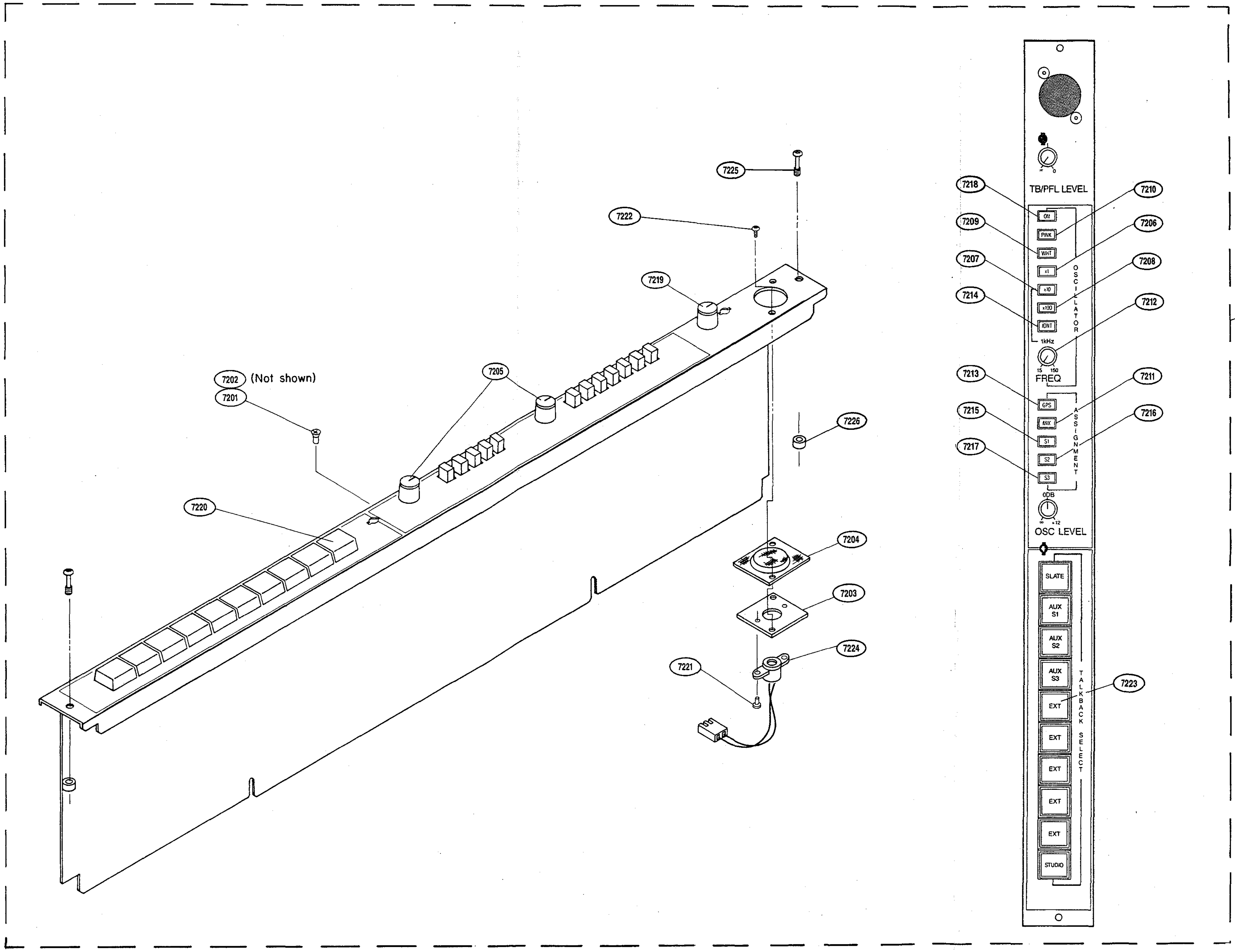
Ref. No.	SONY Part No.	Description	Serv. Code
7200	T-9481-963-1	Communications Module Mech. Assy.	O
7201	7-682-248-04	Screw, Csk, M3x8 (x4)	S
7202	T-9451-577-2	Spacer, PCB (x4)	S
7203	T-9451-578-1	Plate, Microphone Mounting	U
7204	T-9451-684-1	Grille, .025 Perf Sht	O
7205	T-9451-835-1	Cap, 10mm, Red (x2)	S
7206	T-9452-426-1	Button, "X1"	S
7207	T-9452-427-1	Button, "X10"	S
7208	T-9452-428-1	Button, "X100"	S
7209	T-9452-429-1	Button, "WHT"	S
7210	T-9452-430-1	Button, "PINK"	S
7211	T-9452-433-1	Button, "MIX"	S
7212	T-9452-463-1	Knob, 10mm, 1/8 Shaft (x3)	S
7213	T-9452-517-1	Button, "GPS"	S
7214	T-9452-518-1	Button, "IDNT"	S
7215	T-9452-519-1	Button, "S1"	S
7216	T-9452-520-1	Button, "S2"	S
7217	T-9452-521-1	Button, "S3"	S
7218	T-9452-522-1	Button, "ON"	S
7219	T-9453-117-1	Cap, 10mm, Dk Grey	S
7220	T-9453-299-1	Cap, Switch, W/Clear Lens (x10)	S
7221	T-9453-300-1	Screw, BH HD, 2-56x3/16 (x2)	S
7222	T-9453-301-1	Screw, ALN BH HD, 6-32x1/1/4 (x2)	S
7223	T-9453-504-1	Labels, Switch	S
7224	T-9481-511-2	CMI Assy, APX-059	O
7225	T-9452-959-2	Screw, BT HD, 6-32x3/8 (x2)	S
7226	T-9451-595-3	Standoff, Modified (x2)	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked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7206
7208
7212
7211
7216
7223
7200
TB/PFL LEVEL
ON
PINK
WHT
x1
x10
x100
IDNT
OSCILLATOR
1kHz
15
150
FREQ
GPS
MIX
S1
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S3
ASSIGNMENT
0DB
∞
+12
OSC LEVEL
SLATE
AUX S1
AUX S2
AUX S3
EXT
EXT
EXT
EXT
EXT
STUDIO
TALKBACK SELECT

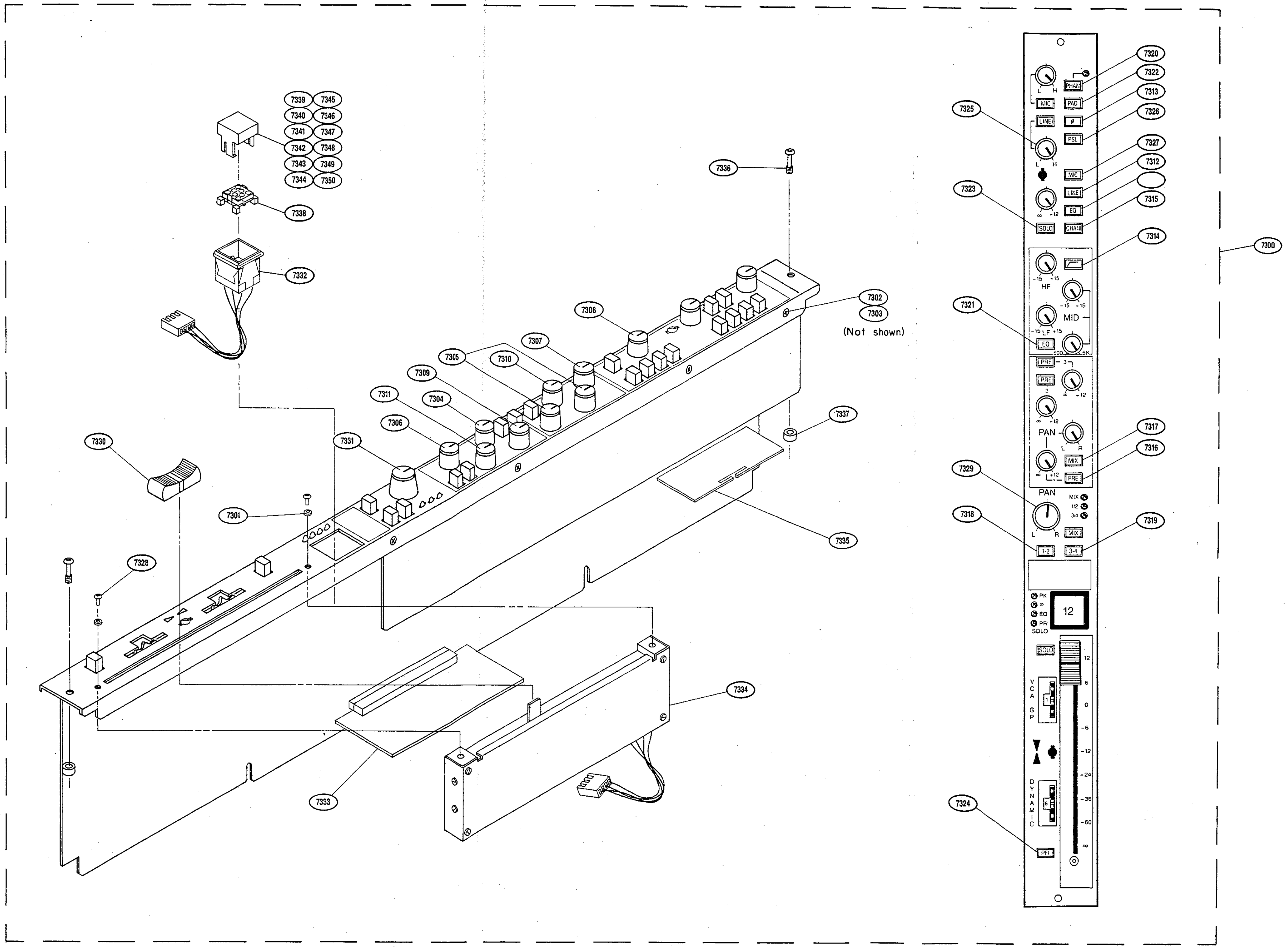
Figure 6-7. Communications Module (COM) Mechanical Assembly

Input/Output Module (IOM) MXBK-2001 Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
7300	T-9481-966-1	Input/Output Module MXBK-2001	P
7301	3-701-439-11	Washer (x2)	S
7302	7-682-248-04	Screw, Csk, M3x8 (x7)	S
7303	T-9451-577-2	Spacer, PCB (x7)	S
7304	T-9451-694-1	Cap,10mm, Blue	O
7305	T-9451-695-1	Cap 10mm, Yellow (x2)	O
7306	T-9451-696-1	Cap,10mm, Green	O
7307	T-9451-697-1	Cap,10mm, White	S
7308	T-9451-700-1	Cap,10mm, Black	S
7309	T-9451-701-1	Cap,10mm, Grey (x3)	S
7310	T-9451-702-1	Cap,10mm, Orange	S
7311	T-9451-835-1	Cap,10mm, Red	S
7312	T-9452-415-1	Button, “LINE” (x2)	S
7313	T-9452-416-1	Button, “ø”	S
7314	T-9452-417-1	Button, “/‾‾ ”	S
7315	T-9452-419-1	Button, “CHAN”	S
7316	T-9452-420-1	Button, “PRE” (x3)	S
7317	T-9452-433-1	Button, “MIX”	S
7318	T-9452-434-1	Button, “1-2”	S
7319	T-9452-435-1	Button, “3-4”	S
7320	T-9452-438-1	Button, “PHAN”	S
7321	T-9452-439-1	Button, “EQ”	S
7322	T-9452-440-1	Button, “PAD”	S
7323	T-9452-459-1	Button, “SOLO” (x2)	S
7324	T-9452-460-1	Button, “PFL”	S
7325	T-9452-463-2	Knob, 10mm, 1/8 Shaft (x11)	S
7326	T-9452-513-1	Button, “PSL”	S
7327	T-9452-514-1	Button, “MIC”	S
7328	T-9452-814-1	Screw, BT HD, 4-40x1/4 (x2)	S
7329	T-9452-887-1	Knob, 15mm, 1/8 Shaft	S
7330	T-9452-890-1	Knob, Fader, 11mm, White	S
7331	T-9453-138-1	Cap, 15mm, Dk Grey	S
7332	T-9481-888-1	MG Function Switch Assembly	O
7333	T-9481-916-2	Printed Wiring Assembly, VCA	S
7334	T-9481-967-2	Fader Assembly, IAM	S
7335	T-9482-276-1	Shield Plate Assembly	O
7336	T-9452-959-2	Screw, BT HD, 6-32x3/8 (x2)	S
7337	T-9451-595-3	Standoff, Modified (x2)	S
7338	T-9413-684-1	LED Module, 17mm, Yellow	S
7339	T-9453-151-1	Cap, Switch, “1”	S
7340	T-9453-152-1	Cap Switch, “2”	S
7341	T-9453-153-1	Cap, Switch, “3”	S
7342	T-9453-154-1	Cap, Switch, “4”	S
7343	T-9453-155-1	Cap, Switch, “5”	S
7344	T-9453-156-1	Cap, Switch, “6”	S
7345	T-9453-157-1	Cap, Switch, “7”	S
7346	T-9453-158-1	Cap, Switch, “8”	S
7347	T-9453-159-1	Cap, Switch, “9”	S
7348	T-9453-160-1	Cap, Switch, “10”	S
7349	T-9453-161-1	Cap, Switch, “11”	S
7350	T-9453-162-1	Cap, Switch, “12”	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked
P: **Major assemblies** — available as product, and not as service parts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PAD
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-15 +15
HF
MID
LF
EQ
500
5K
PRE
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PRE
2
∞ +12
PAN
L R
MIX
PRE
PAN
MIX
1/2
3/4
MIX
1-2
3-4
PK
ø
EQ
PFL
SOLO
12
SOLO
VCA GP
DYNAMIC
12
6
0
-6
-12
-24
-36
-60
∞
PFL

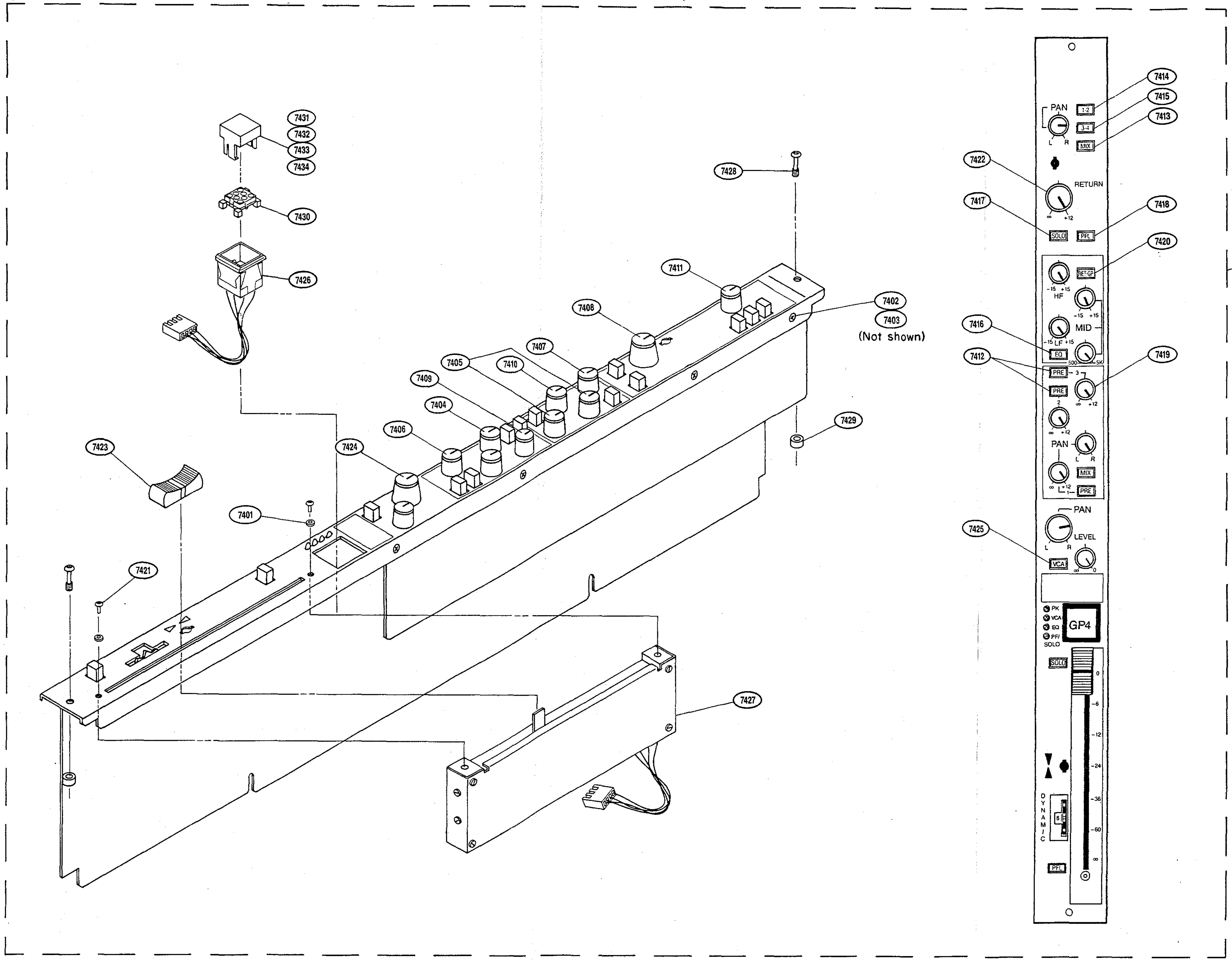
Figure 6-8. Input/Output Module (IOM) Mechanical Assembly

Group Module (GPM) MXBK-2002 Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
7400	T-9481-968-1	Group Module MXBK-2002	P
7401	3-701-439-11	Washer (x2)	S
7402	7-682-248-04	Screw, Csk, M3x8 (x7)	S
7403	T-9451-577-2	Spacer, PCB (x7)	S
7404	T-9451-694-1	Cap, 10mm, Blue	O
7405	T-9451-695-1	Cap, 10mm, Yellow (x2)	S
7406	T-9451-696-1	Cap, 10mm, Green	S
7407	T-9451-697-1	Cap, 10mm, White	S
7408	T-9451-698-1	Cap, 15mm, Grey	S
7409	T-9451-701-1	Cap, 10mm, Grey (x2)	S
7410	T-9451-702-1	Cap, 10mm, Orange	S
7411	T-9451-835-1	Cap, 10mm, Red (x2)	S
7412	T-9452-420-1	Button, "PRE" (x3)	S
7413	T-9452-433-1	Button, "MIX" (x2)	S
7414	T-9452-434-1	Button, "1-2"	S
7415	T-9452-435-1	Button, "3-4"	S
7416	T-9452-439-1	Button, "EQ"	S
7417	T-9452-459-1	Button, "SOLO" (x2)	S
7418	T-9452-460-1	Button, "PFL" (x2)	S
7419	T-9452-463-1	Knob, 10mm, 1/8 Shaft (x10)	S
7420	T-9452-515-1	Button, "RET/GP"	S
7421	T-9452-814-1	Screw, BT HD, 4-40x1/4 (x2)	S
7422	T-9452-887-1	Knob, 15mm, 1/8 Shaft, Dk Grey (x2)	S
7423	T-9453-891-1	Knob, Fader, 11mm, Blue	S
7424	T-9453-138-1	Cap, 15mm, Dk Grey	O
7425	T-9453-181-1	Button, "VCA"	S
7426	T-9481-888-1	MG Function Switch Assy	O
7427	T-9481-969-1	Fader Assembly, Group (GFA)	S
7428	T-9452-959-2	Screw, BT HD, 6-32x3/8 (x2)	S
7429	T-9451-595-3	Standoff, Modified (x2)	S
7430	T-9413-684-1	LED Module, 17mm, Yellow	S
7431	T-9453-171-1	Cap, Switch "GP1"	S
7432	T-9453-172-1	Cap, Switch "GP2"	S
7433	T-9453-173-1	Cap, Switch "GP3"	S
7434	T-9453-174-1	Cap, Switch "GP4"	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked
P: **Major assemblies** — available as product, and not as service parts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7416
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7425
PAN
1-2
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MIX
L R
RETURN
∞ +12
SOLO
PFL
SET GP
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PK
VCA
SQ
PFL/SOLO
GP4
SOLO
0
-6
-12
-24
-36
-60
∞
DYNAMIC
PFL

Figure 6-9. Group Module (GPM) Mechanical Assembly

Stereo Input Module MXBK-2004 (SIM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
7500	T-9482-618-1	Stereo Input Module MXBK-2004	P
7501	3-701-439-11	Washer	S
7502	7-682-248-04	Screw, Csk, M3x8	S
7503	T-9451-577-2	Spacer, PCB	S
7504	T-9451-694-1	Cap, 10mm, Blue	S
7505	T-9451-695-1	Cap, 10mm, Yellow (x2)	S
7506	T-9451-696-1	Cap, 10mm, Green	S
7507	T-9451-697-1	Cap, 10mm, White	S
7508	T-9451-700-1	Cap, 10mm, Black	S
7509	T-9451-701-1	Cap, 10mm, Grey (x2)	S
7510	T-9451-702-1	Cap, 10mm, Orange	S
7511	T-9451-835-1	Cap, 10mm, Red	S
7512	T-9452-416-1	Button, “ø”	S
7513	T-9452-419-1	Button, “CHAN”	S
7514	T-9452-420-1	Button, “PRE” (x3)	S
7515	T-9452-433-1	Button, “MIX” (x2)	S
7516	T-9452-434-1	Button, “1-2”	S
7517	T-9452-435-1	Button, “3-4”	S
7518	T-9452-439-1	Button, “EQ” (x2)	S
7519	T-9452-459-1	Button, “SOLO” (x2)	S
7520	T-9452-460-1	Button, “PFL”	S
7521	T-9452-463-1	Knob, 10mm, 1/8 Shaft (x10)	S
7522	T-9452-814-1	Screw, BT HD, 4-40x1/4 (x2)	S
7523	T-9452-887-1	Knob, 15mm, 1/8 Shaft	S
7524	T-9452-890-1	Knob, Fader, 11mm, White	S
7525	T-9453-138-2	Cap, 15mm, Dk Grey	S
7526	T-9453-461-1	Button, “IP1” (x2)	S
7527	T-9453-462-1	Button, “IP2” (x2)	S
7528	T-9453-463-1	Button, “IP3” (x2)	S
7529	T-9453-464-1	Button, “MONO L”	S
7530	T-9453-465-1	Button, “MONO R”	S
7531	T-9453-503-1	Bearing, Potentiometer, Special (x7)	S
7532	T-9481-888-1	MG Function Switch Assembly	O
7533	T-9481-916-2	Printed Wiring Assembly, VCA	S
7534	T-9481-967-2	Fader Assembly, IAM	S
7535	T-9482-276-1	Shield Plate Assembly	S
7536	T-9452-959-2	Screw, BT HD, 6-32x3/8 (x2)	S
7537	T-9451-595-3	Standoff, Modified (x2)	S
7538	T-9413-684-1	LED Module, 17mm, Yellow	S
7539	T-9453-151-1	Cap, Switch, “1”	S
7540	T-9453-152-1	Cap, Switch, “2”	S
7541	T-9453-153-1	Cap, Switch, “3”	S
7542	T-9453-154-1	Cap, Switch, “4”	S
7543	T-9453-155-1	Cap, Switch, “5”	S
7544	T-9453-156-1	Cap, Switch, “6”	S
7545	T-9453-157-1	Cap, Switch, “7”	S
7546	T-9453-158-1	Cap, Switch, “8”	S
7547	T-9453-159-1	Cap, Switch, “9”	S
7548	T-9453-160-1	Cap, Switch, “10”	S
7549	T-9453-161-1	Cap, Switch, “11”	S
7550	T-9453-162-1	Cap, Switch, “12”	S

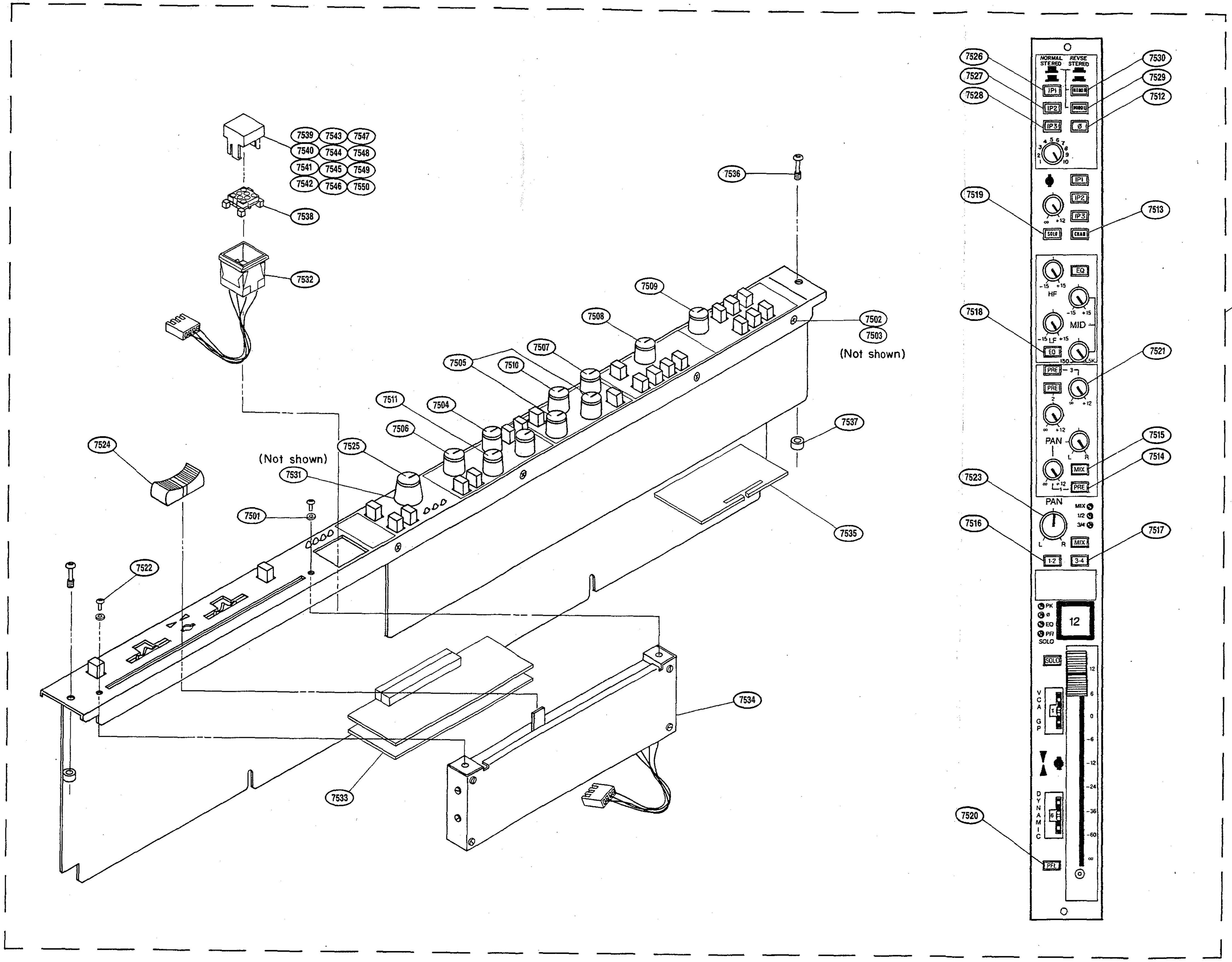
SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

P: **Major assemblies** — available as product, and not as service parts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7516
7517
7520
NORMAL STEREO
REVSE STEREO
IP1
IP2
IP3
MONO
Ø
SOLO
CHAN
EQ
HF
MID
LF
PRE
PAN
L
R
MIX
1/2
3/4
1-2
3-4
12
PK
EQ
PFI
SOLO
VCA GP
DYNAMIC
PFL

Figure 6-10. Stereo Input Module (SIM) Mechanical Assembly

Dynamics Module (DYN) MXBK-2003 Parts List

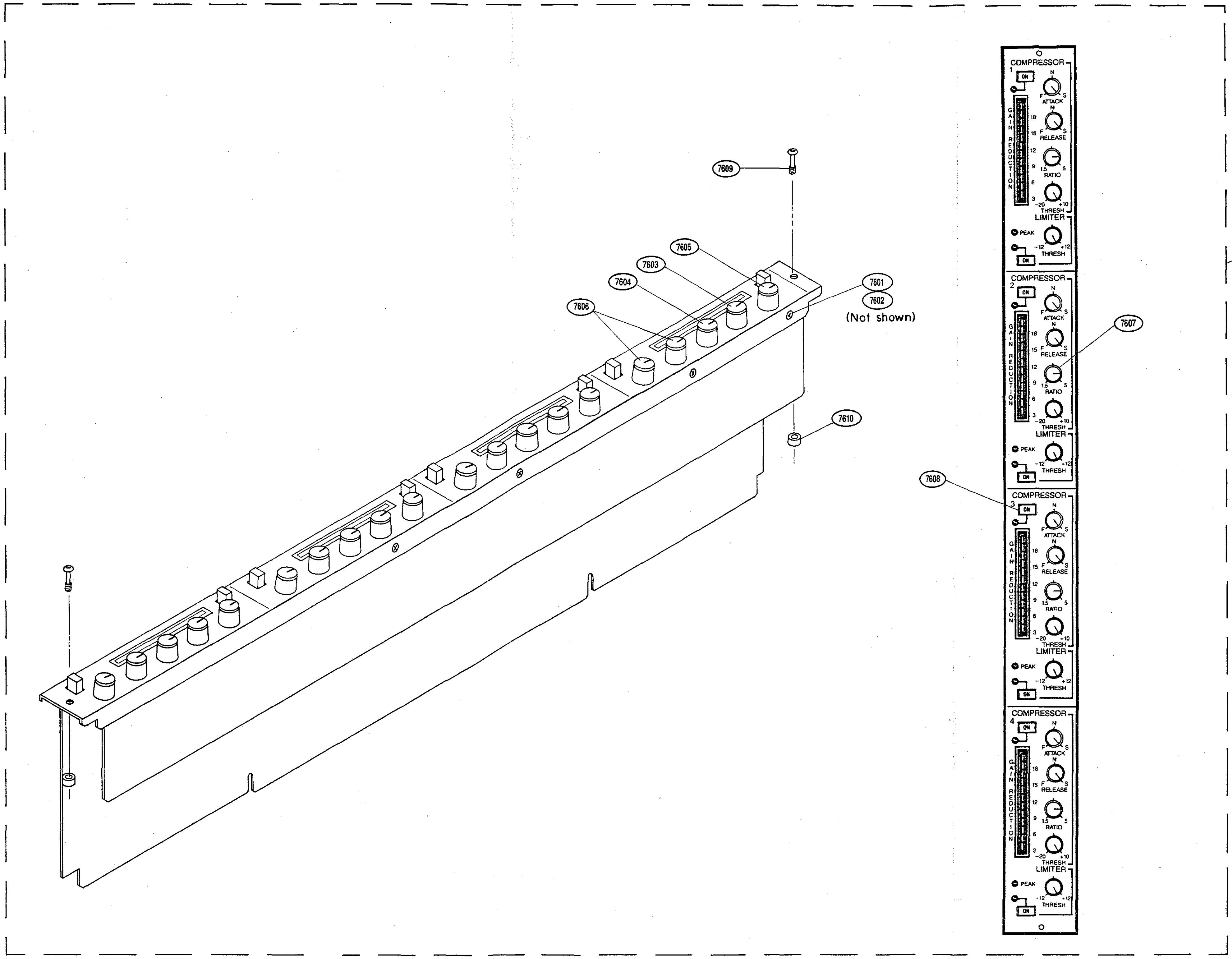
Ref. No.	SONY Part No.	Description	Serv. Code
7600	T-9481-965-1	Dynamics Module MXBK-2003	P
7601	7-682-248-04	Screw, Csk, M3x8 (x9)	S
7602	T-9451-577-2	Spacer, PCB (x9)	S
7603	T-9451-694-1	Cap, 10mm, Blue (x4)	S
7604	T-9451-695-1	Cap, 10mm, Yellow (x4)	O
7605	T-9451-697-1	Cap, 10mm, White (x4)	S
7606	T-9451-835-1	Cap, 10mm, Red (x8)	S
7607	T-9452-463-1	Knob, 10mm, 1/8 Shaft (x20)	S
7608	T-9452-522-1	Button, "ON" (x8)	S
7609	T-9452-959-2	Screw, BT HD, 6-32x3/8 (x2)	S
7610	T-9451-595-3	Standoff, Modified (x2)	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked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COMPRESSOR 1
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ON
GAIN REDUCTION
18
15
12
9
6
3
N
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Figure 6-11. Dynamics Module (DYN) Mechanical Assembly)

Power Supply Assembly AC-P2000 (PSU) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
8000	T-9482-366-1	Power Supply Assembly AC-P2000	P
8001	1-554-066-11	Switch, Power (S1)	S
8002	3-672-268-01	Logo, SONY	S
8003	7-623-212-22	Washer, Split Lock, M5 (x4)	S
8004	7-623-308-07	Washer, Lock, Int. Tooth, M3 (x6)	S
8005	7-623-310-07	Washer, Lock, Int. Tooth, M4 (x20)	S
8006	7-682-550-04	Screw, Phillips, M3x12 (x2)	S
8007	7-682-564-04	Screw, Phillips, M4x14 (x6)	S
8008	7-684-023-04	Nut, Hex, M3 (x6)	S
8009	7-684-024-04	Nut, Hex, M4 (x8)	S
8010	7-684-025-04	Nut, Hex, M5 (x4)	S
8011	7-686-527-01	Screw, Totsu, PSW, M3x6 (x16)	S
8012	7-686-549-01	Screw, Totsu, PSW, M4x10 (x13)	S
8013	7-686-552-01	Screw, Totsu, PSW, M4x16 (x4)	S
8014	7-686-638-04	Screw, Totsu, CRN, M4x14 (x6)	S
8015	7-688-005-01	Washer, Flat, M5 (x4)	S
8016	8-759-931-70	Regulator, Voltage, LM317T (IC1)	S
8017	T-9410-113-1	Rectifier, 250JB2L (D25,26,27,28) (x4)	S
8018	T-9410-625-1	Regulator, Voltage, LM338KT03 (IC2)	S
8019	T-9411-118-1	Fuse, 3AG, 2.5A, SLO-BLO	S
8020	T-9412-727-1	Cord, Power, AC, 17250	S
8021	T-9413-252-2	Transformer, Power	O
8022	T-9413-394-1	Circuit Breaker, 0.25A (F4)	S
8023	T-9413-395-1	Circuit Breaker, 5.0A (F1,2,3) (x3)	S
8024	T-9413-398-1	Regulator, Voltage, TL783CKC (IC5)	S
8025	T-9413-561-1	Insulator, Silicon Pad, K4-06 (x3)	S
8026	T-9413-562-1	Insulator, Silicon Pad, K4-54 (x2)	S
8027	T-9452-468-1	Washer, Shoulder, 7721-7PPS (x2)	S
8028	T-9452-949-1	Spacer, Nylon (x6)	S
8029	T-9452-950-1	Handle, Plated (x2)	O
8030	T-9452-958-1	Screw, FH SKT, 10-32x3/4 (x4)	S
8031	T-9453-418-1	Screw, Flat Head, M4x14 (x8)	S
8032	T-9453-222-1	Label, Pinout	O
8033	T-9453-392-2	Label, Fuse Info	O
8034	T-9453-393-1	Label, Ground Terminal	O
8035	3-703-043-31	Label, Caution, Main	O
8036	3-703-044-26	Label, Fuse	O
8037	3-703-079-31	Label, Sub-Caution	O
8038	T-9453-412-1	Wshr, Lk, Ext. Tooth, Csk, #10 (x4)	S
8039	T-9481-921-1	Printed Wiring Assembly, PSU	O
8040	T-9481-922-1	Printed Wiring Assembly, BCB	O
8041	T-9482-344-1	Wire Assembly, Audio Ground	O
8042	T-9482-355-1	Wire Assembly, Voltage Select	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

P: **Major assemblies** — available as product, and not as service parts

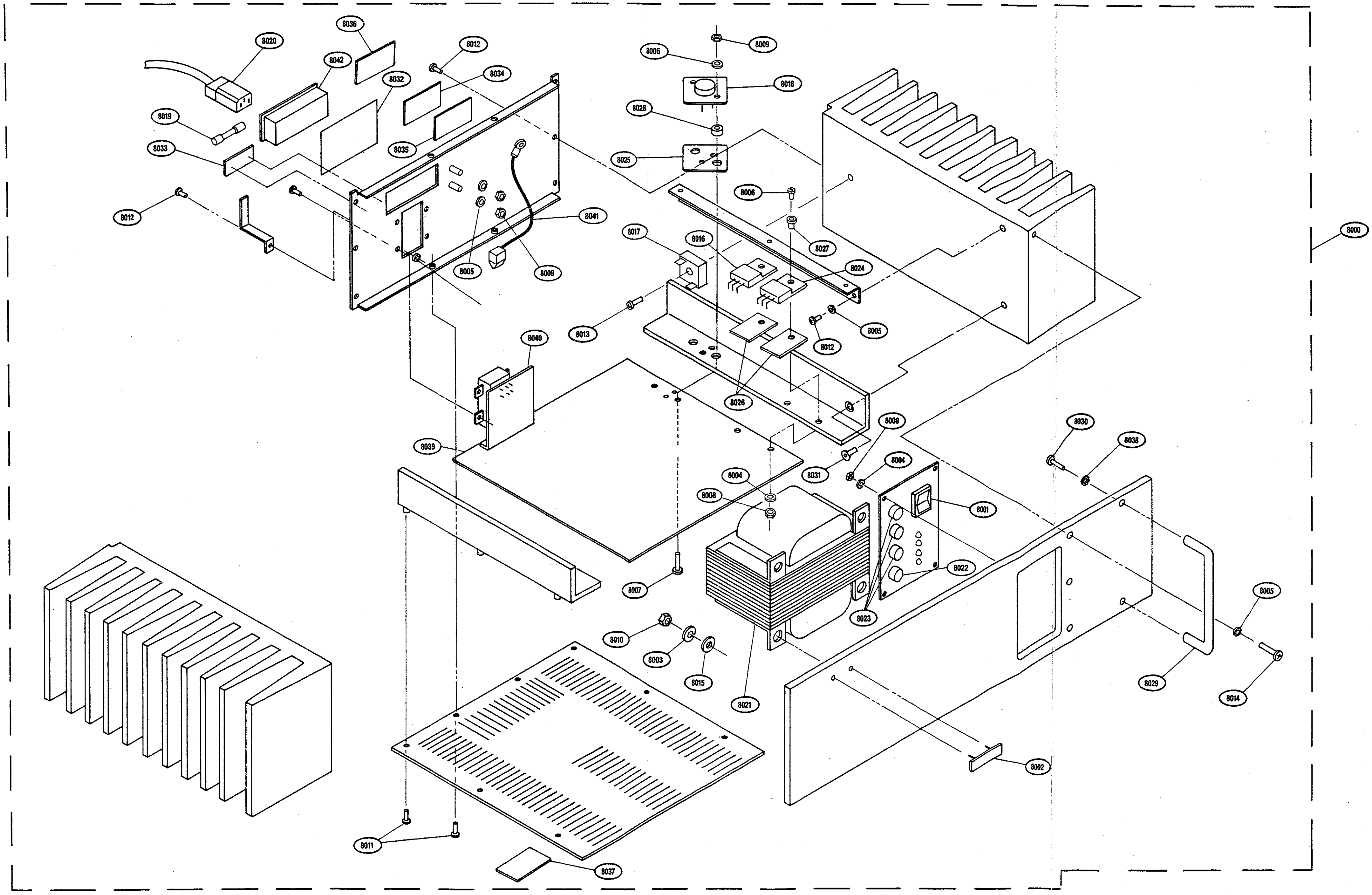
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Figure 6-12. **Power Supply (PSU) Mechanical Assembly)**

Mother Board A (MBA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9410-677-1	Capacitor, 100mF/25V Electrolytic	O
J1-20	T-9413-466-1	Connector, 45 pin, PC Mount	O
J21-40	T-9413-254-1	Connector, Card Edge 72 pin	O
J42	T-9413-471-1	Connector, 4 pin, PC Mount	O
J43	T-9413-473-1	Connector, 10 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Mother Board B (MBB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
J5	1-560-192-11	Connector, PS-50PA-D4LT1-A1	O
J6-25	T-9413-254-1	Connector, Card Edge 72 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

Dummy Editor Board (DEB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
CNJ3	1-560-192-11	Connector, PS-50PA-D4LT1-A1	O
CNJ4	1-560-617-11	Connector, PS-26PA-D4LT1-A1	O
CNJ5	1-560-334-11	Connector, PS-10PA-D4LT1-A1	O
JW1	1-561-832-11	Jumper Sockets	S
JW1-2	1-560-733-11	Jumper-Pins	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

Editor Interface Card (EIC) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	1-123-611-11	Capacitor, 1.0uF/50V Electrolytic	S
C5-6	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C7	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C8-11	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C12-56	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
CNJ1-2	T-9413-744-1	Jumper, Blk, 34P, 0.1 Spacing	S
CNJ1A-H	1-561-832-11	Jumper Socket	S
CNJ2A-H	1-561-832-11	Jumper Socket	S
CNJ3	1-560-192-11	Connector, PS-50PA-D4LT1-A1	O
CNJ4	1-560-617-11	Connector, PS-26PA-D4LT1-A1	O
CNJ5	1-560-334-11	Connector, PS-10PA-D4LT1-A1	O
D1-17	8-719-991-40	Diode, 1N914	S
D18-21	8-719-305-15	Diode, J4	S
D22-37	8-719-991-40	Diode, 1N914	S
E1	T-9413-737-1	Jumper, Insulated 0.175	U
E2	T-9413-659-1	Jumper, 0.1 Inch	U
IC1-2	8-759-990-04	IC TL074	S
IC3-4	8-759-001-06	IC 74HC08	S
IC5	8-759-001-01	IC 74HC00	S
IC6	T-9411-113-1	IC DG212CJ	S
IC7	8-759-990-04	IC TL074	S
IC8	T-9411-242-1	IC DG211	S
IC9-11	T-9411-113-1	IC DG212CJ	S
IC12	8-759-990-04	IC TL074	S
IC13	T-9411-242-1	IC DG211	S
IC14-15	T-9411-113-1	IC DG212CJ	S
IC16	8-759-990-72	IC TL072	S
IC17	T-9413-476-1	IC RC4200ANB	S
IC18-19	8-759-990-72	IC TL072	S
IC20	T-9413-476-1	IC RC4200ANB	S
IC21-22	8-759-001-06	IC 74HC08	S
IC23	8-759-202-17	IC 74HC14	S
IC24-25	8-759-001-01	IC 74HC00	S
IC26	8-759-001-06	IC 74HC08	S
IC28-29	8-759-202-17	IC 74HC14	S
JW17-28	1-560-733-11	Jumper Pins	O
JW19-20	1-561-832-11	Jumper Socket	S
JW22	1-561-832-11	Jumper Socket	S
JW24	1-561-832-11	Jumper Socket	S
JW26-27	1-561-832-11	Jumper Socket	S
Q1	8-759-178-15	Voltage Regulator, POS 7815T0220	S
Q2	8-759-179-15	Voltage Regulator, NEG 7915T0220	S
Q3	8-729-139-04	Transistor, 2N3904	S
Q4	T-9410-105-1	Transistor, 2N3906	S
R1	1-215-830-11	Resistor, 100K 1/8W 1%	S
R2-17	1-214-581-11	Resistor, 10K 1/8W 1%	S
R18-26	1-215-830-11	Resistor, 100K 1/8W 1%	S
R27	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R28-33	1-215-830-11	Resistor, 100K 1/8W 1%	S
R34	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R35	1-214-581-11	Resistor, 10K 1/8W 1%	S
R36	1-214-585-11	Resistor, 15K 1/8W 1%	S
R37	1-215-830-11	Resistor, 100K 1/8W 1%	S
R38	T-9411-564-1	Resistor, 31.6K 1/8W 1%	S
R39	1-214-581-11	Resistor, 10K 1/8W 1%	S
R40	1-247-879-51	Resistor, 100K 1/6W 5%	S
R41	1-214-581-11	Resistor, 10K 1/8W 1%	S
R42	1-214-588-11	Resistor, 20K 1/8W 1%	S
R43-44	1-247-879-51	Resistor, 100K 1/6W 5%	S
R45	1-214-581-11	Resistor, 10K 1/8W 1%	S
R46	1-247-879-51	Resistor, 100K 1/6W 5%	S
R47	1-214-581-11	Resistor, 10K 1/8W 1%	S
R48	1-215-830-11	Resistor, 100K 1/8W 1%	S
R49	T-9411-564-1	Resistor, 31.6K 1/8W 1%	S
R50	1-214-588-11	Resistor, 20K 1/8W 1%	S
R52-55	1-214-581-11	Resistor, 10K 1/8W 1%	S
R56-57	1-215-830-11	Resistor, 100K 1/8W 1%	S
R58	1-215-822-11	Resistor, 47K 1/8W 1%	S
R59-60	1-215-830-11	Resistor, 100K 1/8W 1%	S
R61	1-215-822-11	Resistor, 47K 1/8W 1%	S
R62-63	1-215-830-11	Resistor, 100K 1/8W 1%	S
R64	1-215-822-11	Resistor, 47K 1/8W 1%	S
R65	1-215-830-11	Resistor, 100K 1/8W 1%	S
R66	1-215-822-11	Resistor, 47K 1/8W 1%	S
R67-68	1-215-830-11	Resistor, 100K 1/8W 1%	S
R69	1-215-822-11	Resistor, 47K 1/8W 1%	S
R70-71	1-215-830-11	Resistor, 100K 1/8W 1%	S
R72	1-215-822-11	Resistor, 47K 1/8W 1%	S
R73-74	1-215-830-11	Resistor, 100K 1/8W 1%	S
R75	1-215-822-11	Resistor, 47K 1/8W 1%	S
R76-78	1-215-830-11	Resistor, 100K 1/8W 1%	S
R79	1-215-822-11	Resistor, 47K 1/8W 1%	S
R80	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R81	1-214-585-11	Resistor, 15K 1/8W 1%	S
R82-85	1-247-879-51	Resistor, 100K 1/6W 5%	S
R88-95	1-214-557-11	Resistor, 1K 1/8W 1%	S
R100	1-214-581-11	Resistor, 10K 1/8W 1%	S
R101	1-215-830-11	Resistor, 100K 1/8W 1%	S
R102	1-214-581-11	Resistor, 10K 1/8W 1%	S
R103	1-215-830-11	Resistor, 100K 1/8W 1%	S
R104	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R105-120	1-247-831-51	Resistor, 1K 1/6W 5%	S
RN1-2	1-235-005-11	Resistor network, 47K, 9-pin	S
RV1	1-226-322-11	Potentiometer, 10K 18 Turns	S
RV2	1-228-932-11	Potentiometer, 10K 18T Side	S
RV3	1-226-322-11	Potentiometer, 10K 18 Turns	S
RV4	1-228-932-11	Potentiometer, 10K 18T Side	S
TP2-14	3-657-235-01	Test Point	U

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Automated Editor Board (AEB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
	T-9413-695-1	Jumper, Insulated 0.250 Long	O
CNJ1	T-9413-692-1	Connector, RA AMP 552726-1	O
CNJ2	T-9413-693-1	Connector, 15P RA AMP745435-5	O
CNJ3	T-9413-691-1	Connector, RA AMP 552726-1	O
CNJ3	T-9453-351-1	Lock Kit Amp 552561-3	O
CNJ4	T-9413-694-1	Connector, 25P RA AMP745436-5	O
CNJ5	T-9413-473-1	Connector,CN 10 Pin, Open Pin Header	O
CNJ6	T-9412-082-1	Connector, PS20PE-D4T1-PN-1	O
CNJ7	T-9413-474-1	Connector, CN 30 PS30PE-D4T1-P	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Voltage Controlled Amplifier (VCA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C2	1-123-333-11	Capacitor, 100uF/25V Electrolytic	S
C3	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C4	1-123-333-11	Capacitor, 100uF/25V Electrolytic	S
C5	T-9411-036-1	Capacitor, 220uF/16V Electrolytic	S
C6	T-9411-280-1	Capacitor, 33pF/100V Ceramic	S
C7	T-9411-310-1	Capacitor, 0.01uF/100V Ceramic	S
C8	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C9-10	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C11	T-9411-303-1	Capacitor, 2700pF/100V Ceramic	S
C12	T-9411-310-1	Capacitor, 0.01uF/100V Ceramic	S
C13-16	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
D1	T-9410-341-1	Diode, 1N5241B	S
D2-5	8-719-991-40	Diode, 1N914	S
IC1	T-9412-317-1	IC DBX2151	S
IC2	8-759-990-04	IC TL074	S
IC3	8-759-990-72	IC TL072	S
JW1-2	1-560-733-11	Jumper-Pins	O
R1-2	T-9411-653-1	Resistor, 1.82K 1/8W 1%	S
R3	1-247-879-51	Resistor, 100K 1/6W 5%	S
R4-5	1-214-588-11	Resistor, 20K 1/8W 1%	S
R6	1-247-879-51	Resistor, 100K 1/6W 5%	S
R7	1-214-569-11	Resistor, 3.3K 1/8W 1%	S
R8	1-214-526-11	Resistor, 51 ohm 1/8W 1%	S
R9	T-9411-564-1	Resistor, 31.6K 1/8W 1%	S
R10	1-214-588-11	Resistor, 20K 1/8W 1%	S
R11	1-215-830-11	Resistor, 100K 1/8W 1%	S
R12	T-9411-867-1	Resistor, 105K 1/8W 1%	S
R13	1-215-830-11	Resistor, 100K 1/8W 1%	S
R14	T-9411-648-1	Resistor, 200K 1/8W 1%	S
R15	1-215-830-11	Resistor, 100K 1/8W 1%	S
R16-17	T-9411-838-1	Resistor, 49.9K 1/8W 1%	S
R18	T-9413-644-1	Resistor, 14.7K 1/8W 1%	S
R19	1-214-557-11	Resistor, 1K 1/8W 1%	S
R20-21	1-214-581-11	Resistor, 10K 1/8W 1%	S
R22	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R23-25	1-214-581-11	Resistor, 10K 1/8W 1%	S
R26	T-9411-897-1	Resistor, 221.0K 1/8W 1%	S
R27-28	1-214-557-11	Resistor, 1K 1/8W 1%	S
R29	1-215-830-11	Resistor, 100K 1/8W 1%	S
R29	T-9411-880-1	Resistor, 143K 1/8W 1%	S
R30	1-215-830-11	Resistor, 100K 1/8W 1%	S
R31-32	1-214-523-11	Resistor, 39 ohm 1/8W 1%	S
R33	1-247-887-51	Resistor, 220K 1/6W 5%	S
R34	1-214-579-11	Resistor, 8.2K 1/8W 1%	S
R35	1-214-557-11	Resistor, 1K 1/8W 1%	S
RV1	1-228-908-11	Potentiometer, 50K 18T Side Adjust	S
RV2	1-228-369-11	Potentiometer, 5K 18T Side Adjust	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Electronic Microphone Amplifier (EMA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9411-716-1	Capacitor, 47pF/100V Ceramic	S
C2-3	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C4-5	T-9411-276-1	Capacitor, 15pF/100V Ceramic	S
C6	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C7	T-9411-268-1	Capacitor, 220pF/100V Ceramic	S
C8-9	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C10	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C11	T-9411-716-1	Capacitor, 47pF/100V Ceramic	S
C12	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C13	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C14	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C15	T-9411-268-1	Capacitor, 220pF/100V Ceramic	S
D1-4	8-719-991-40	Diode 1N914	S
IC1	T-9413-580-1	IC SM2015	S
IC2	8-759-905-34	IC NE5534AN SIG	S
R1-2	1-247-855-51	Resistor, 10K 1/6W 5%	S
R3	1-247-865-51	Resistor, 27K 1/6W 5%	S
R4	1-247-844-51	Resistor, 3.6K 1/6W 5%	S

Ref. No.	SONY Part No.	Description	Serv. Code
R5	1-247-879-51	Resistor, 100K 1/6W 5%	S
R6	1-247-792-51	Resistor, 24 ohm 1/6W 5%	S
R7	T-9411-536-1	Resistor, 118 ohm 1/8W 1%	S
R9	1-247-833-51	Resistor, 1.2K 1/6W 5%	S
R10-11	T-9413-639-1	Resistor, 536 ohm 1/8W 1%	S
R12	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R13	1-247-879-51	Resistor, 100K 1/6W 5%	S
R14	1-247-855-51	Resistor, 10K 1/6W 5%	S
R15	1-247-811-51	Resistor, 150 ohm 1/6W 5%	S
R16-17	1-247-879-51	Resistor, 100K 1/6W 5%	S
RV1	1-224-932-11	Potentiometer, 50, 1 Turn, Side Adj	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

Electronic Line Amp (ELA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-2	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C3	T-9411-280-1	Capacitor, 33pF/100V Ceramic	S
C4-5	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
C6	T-9411-292-1	Capacitor, 330pF/100V Ceramic	S
C7	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C8	T-9411-036-1	Capacitor, 220uF/16V Electrolytic	S
C9	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C10-13	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C14	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
CNP1	T-9413-569-1	Connector, 15 pin, SIP	O
IC1	8-759-900-72	IC NE5532AP T.I.	S
R1	1-214-568-11	Resistor, 3K 1/8W 1%	S
R2	T-9411-814-1	Resistor, 27.4K 1/8W 1%	S
R3	T-9411-663-1	Resistor, 2.26K 1/8W 1%	S
R4	1-215-830-11	Resistor, 100K 1/8W 1%	S
R5	1-214-557-11	Resistor, 1K 1/8W 1%	S
R6	1-214-580-11	Resistor, 9.1K 1/8W 1%	S
R7	1-214-554-11	Resistor, 750 ohm 1/8W 1%	S
R8	1-215-830-11	Resistor, 100K 1/8W 1%	S
R9	1-214-533-11	Resistor, 100 ohm 1/8W 1%	S
R10	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R11	T-9411-669-1	Resistor, 2.61K 1/8W 1	S
R12	1-214-581-11	Resistor, 10K 1/8W 1%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Transformer Microphone Amplifier (TMA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
IC1	8-759-905-34	IC NE5534AN	S
R1-2	1-247-871-51	Resistor, 47K 1/6W 5%	S
R3	1-247-876-51	Resistor, 75K 1/6W 5%	S
R4	1-247-885-51	Resistor, 180K 1/6W 5%	S
R5	1-247-826-51	Resistor, 620 ohm 1/6W 5%	S
R7	1-247-799-51	Resistor, 47 ohm 1/6W 5%	S
R8	1-247-879-51	Resistor, 100K 1/6W 5%	S
T1	T-9413-575-3	Transformer, (SX2206)	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Transformer Line Amplifier (TLA) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
IC1	8-759-900-72	IC NE5532AP	S
R1	1-247-845-51	Resistor, 3.9K 1/6W 5%	S
R2	1-247-899-51	Resistor, 680K 1/6W 5%	S
R3	1-247-841-51	Resistor, 2.7K 1/6W 5%	S
R4	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R5	1-247-879-51	Resistor, 100K 1/6W 5%	S
R6-7	1-247-848-51	Resistor, 5.1K 1/6W 5%	S
T1	T-9413-575-3	Transformer, SX2206	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes
O: **Order Parts** — orders will be processed, but allow for additional delivery time
U: These parts are seldom required for routine service and are not stocked

Relay Card (RLC) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C43	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
CNJ5	T-9413-569-1	Connector, 15 Pin, SIP, PC Mount	S
D17	8-719-991-40	Diode, 1N914	S
K2	T-9412-099-1	Relay, DS2E-M-DC24V	S
Q20	8-729-139-04	Transistor, 2N3904	S
R109-110	1-247-879-51	Resistor, 100K 1/6W 5%	S
R110	1-247-879-51	Resistor, 100K 1/6W 5%	S
R111	1-247-855-51	Resistor, 10K 1/6W 5%	S
R112	1-247-840-51	Resistor, 2.4K 1/6W 5%	S

SERVICE CODES:

S: Stock Parts — normally stocked for replacement purposes

O: Order Parts — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Monitor Module Sub-Board (MMS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
IC13 & IC18	8-759-990-72	IC TL072	S
R101-102	1-247-855-51	Resistor, 10K 1/6W 5%	S
R103-104	1-247-879-51	Resistor, 100K 1/6W 5%	S
R105-106	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R107-108	1-247-855-51	Resistor, 10K 1/6W 5%	S
R109-110	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R111-125	1-247-879-51	Resistor, 100K 1/6W 5%	S
R126-127	1-247-855-51	Resistor, 10K 1/6W 5%	S
R129	1-247-879-51	Resistor, 100K 1/6W 5%	S
R130-134	1-247-855-51	Resistor, 10K 1/6W 5%	S
R136	1-247-879-51	Resistor, 100K 1/6W 5%	S
R137	1-247-855-51	Resistor, 10K 1/6W 5%	S
R158 & 161	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
W1	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W2	T-9412-097-1	Flex Ribbon Jumper 10 pin	O
W3	T-9412-096-1	Flex Ribbon Jumper 12 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Monitor Module (MML) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C109	T-9411-324-1	Capacitor, 27000pF/100V Ceramic	S
C110	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C111	T-9411-324-1	Capacitor, 27000pF/100V Ceramic	S
C112	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C113	T-9411-324-1	Capacitor, 27000pF/100V Ceramic	S
C114	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C115-116	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C117	T-9411-324-1	Capacitor, 27000pF/100V Ceramic	S
C124	1-123-621-11	Capacitor, 10uF/25V Electrolytic	S
CNP2-4	1-560-310-11	Connector, IL-4P-S3GQ2-1	O
D15-17	8-719-991-40	Diode, 1N914	S
IC19-20	T-9412-563-1	IC 74C02	S
JW1-10	1-560-733-11	Jumper-Pins	O
JW2	1-561-832-11	Jumper Socket	S
JW4	1-561-832-11	Jumper Socket	S
JW6	1-561-832-11	Jumper Socket	S
JW8-9	1-561-832-11	Jumper Socket	S
Q15-17	8-729-139-04	Transistor 2N3904	S
Q18-20	T-9410-105-1	Transistor 2N3906	S
Q21	8-729-304-92	Transistor 2SB649A	S
R138	1-247-831-51	Resistor, 1K 1/6W 5%	S
R139	1-247-855-51	Resistor, 10K 1/6W 5%	S

Ref. No.	SONY Part No.	Description	Serv. Code
R140	1-247-879-51	Resistor, 100K 1/6W 5%	S
R141-142	1-247-855-51	Resistor, 10K 1/6W 5%	S
R143	1-247-831-51	Resistor, 1K 1/6W 5%	S
R144-145	1-247-855-51	Resistor, 10K 1/6W 5%	S
R146	1-247-831-51	Resistor, 1K 1/6W 5%	S
R147	1-247-855-51	Resistor, 10K 1/6W 5%	S
R148	1-247-879-51	Resistor, 100K 1/6W 5%	S
R149-151	1-214-519-11	Resistor, 27 ohm 1/8W 1%	S
R152-153	1-247-855-51	Resistor, 10K 1/6W 5%	S
R154	1-247-879-51	Resistor, 100K 1/6W 5%	S
R155-157	1-247-867-51	Resistor, 33k 1/6W 5%	S
R185	1-247-855-51	Resistor, 10K 1/6W 5%	S
R186	1-247-903-51	Resistor, 1K 1/6W 5%	S
R191-193	1-247-826-51	Resistor, 620 ohm 1/6W 5%	S
W4	T-9413-618-1	Flex Ribbon Jumper, 8 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Input/Output Sub-Board (IOS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C16	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C17	T-9410-958-1	Capacitor, 0.15uF/100V Poly	S
C18	T-9410-963-1	Capacitor, 0.39uF/100V Poly	S
C19	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C20	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C46-47	T-9412-374-1	Capacitor, 22uF/63V Electrolytic	S
C48	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C51-52	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C64-67	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C68-69	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C70-73 & C75	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C76-77	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
DS2	T-9410-044-1	LED, Red MV5074C	S
DS4	T-9410-049-1	LED, Yellow MV5374-C	S
DS5	T-9410-047-1	LED, Green MV5474C	S
DS7	T-9410-044-1	LED, Red MV5074C	S
IC3 & IC10	8-759-990-72	IC TI072	S
R1-3	1-247-879-51	Resistor, 100K 1/6W 5%	S
R4	1-314-568-11	Resistor, 3K 1/8W 1%	S
R5	1-247-879-51	Resistor, 100K 1/6W 5%	S
R16-17	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R19	1-247-879-51	Resistor, 100K 1/6W 5%	S
R20	1-247-855-51	Resistor, 10K 1/6W 5%	S
R21-22	1-247-809-51	Resistor, 120 ohm 1/6W 5%	S
R23	1-247-855-51	Resistor, 10K 1/6W 5%	S
R24-25	1-247-879-51	Resistor, 100K 1/6W 5%	S
R31-32	1-247-855-51	Resistor, 10K 1/6W 5%	S
R33-34	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R73-74	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R75-76	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S
R77	1-247-879-51	Resistor, 100K 1/6W 5%	S
R113-114	1-247-851-51	Resistor, 6.8K 1/6W 5%	S
R115	1-247-823-51	Resistor, 470 ohm 1/6W 5%	S
R116-117	1-247-851-51	Resistor, 6.8K 1/6W 5%	S
R118	1-247-823-51	Resistor, 470 ohm 1/6W 5%	S
RV3	T-9413-532-2	Potentiometer, 5K, Rev Log	S
RV5	T-9412-122-1	Potentiometer, 5K, Linear Ctr Detent	S
RV8	T-9413-523-2	Potentiometer, 5K, Linear 1DK,PC Mount	S
RV15	T-9413-527-1	Potentiometer, 100K, Linear 1Dk,Ctr/Det	S
S1-2	T-9413-517-1	Switch, GP, 4STA, 3-4PDT, 1-2PDT	S
S5	T-9413-517-1	Switch, GP, 4STA, 3-4PDT, 1-2PDT	S
S6-9	T-9413-515-1	Switch, GP 4STA, DPDT, INTL	S
S10	T-9413-507-1	Switch, DPDT, ALT ACT, PC MT	S
S12-13	T-9413-511-1	Switch, GP, 2STA, DPDT, ALT ACT	S
S16-18	T-9413-512-1	Switch, GP, 2STA, 4PDT, ALT ACT	S
S21	T-9413-517-1	Switch, GP, 4STA, 3-4PDT, 1-2PDT	S
W1-4	T-9412-014-1	FLEX RIBBON JUMPER 18PIN	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional *delivery time*

U: These parts are seldom required for routine service and are not stocked

Stereo Input Module Sub-Board (SIS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C18-20	T-9410-039-1	Capacitor, 47uf/16v Electrolytic	S
C21-21	T-9411-266-1	Capacitor, 470pf/100v Ceramic	S
C23	T-9410-039-1	Capacitor, 47uf/16v Electrolytic	S
C24	T-9410-963-1	Capacitor, 0.39uf/100v Poly	S
C25	T-9410-958-1	Capacitor, 0.15uf/100v Poly	S
C26	T-9411-278-1	Capacitor, 22pf/100v Ceramic	S
C27-28	T-9410-039-1	Capacitor, 47uf/16v Electrolytic	S
C32	T-9411-278-1	Capacitor, 22pf/100v Ceramic	S
C33-34	T-9410-039-1	Capacitor, 47uf/16v Electrolytic	S
C35	T-9411-278-1	Capacitor, 22pf/100v Ceramic	S
C36	T-9410-039-1	Capacitor, 47uf/16v Electrolytic	S
C67-72	T-9411-323-1	Capacitor, 0.1uf/100v Ceramic	S
C121-122	T-9411-266-1	Capacitor, 470pf/100v Ceramic	S
C124	T-9410-963-1	Capacitor, 0.39uf/100v Poly	S
C125	T-9410-958-1	Capacitor, 0.15uf/100v Poly	S
C126	T-9411-278-1	Capacitor, 22pf/100v Ceramic	S
C134-135	T-9411-323-1	Capacitor, 0.1uf/100v Ceramic	S
DS1	T-9410-049-1	LED Yellow MV5374C	S
DS2	T-9410-047-1	LED Green MV5474C	S
DS3	T-9410-044-1	LED Red MV5074C	S
IC3	8-759-990-72	IC TL072	S
IC3	T-9411-074-1	Connector, 8P Skt Open Frame	O
IC12-13	8-759-990-72	IC TL072	S
IC12-13	T-9411-074-1	Connector, 8P Skt Open Frame	O
IC103	8-759-990-72	IC TL072	S
IC103	T-9411-074-1	Connector, 8P Skt Open Frame	O
L1-L2 & L101-102	T-9412-802-1	Choke, 220uh	S
R5	T-9413-631-1	Potentiometer, 5DK RLG	S
R18	1-214-588-11	Resistor, 20K 1/8W 1%	S
R19	T-9411-707-1	Resistor, 6.65K 1/8W 1%	S
R20-21	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R22	1-247-879-51	Resistor, 100K 1/6W 5%	S
R23	1-247-855-51	Resistor, 10K 1/6W 5%	S
R24-25	1-247-809-51	Resistor, 120 Ohm 1/6W 5%	S
R26	1-247-855-51	Resistor, 10K 1/6W 5%	S
R27 & R30	1-247-879-51	Resistor, 100K 1/6W 5%	S
R86	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R87	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R88	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S
R89	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R90	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S
R91	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R92-93	1-247-879-51	Resistor, 100K 1/6W 5%	S
R118	1-214-588-11	Resistor, 20K 1/8W 1%	S
R119	T-9411-707-1	Resistor, 6.65K 1/8W 1%	S
R120-121	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R122	1-247-879-51	Resistor, 100K 1/6W 5%	S
R123	1-247-855-51	Resistor, 10K 1/6W 5%	S
R124-125	1-247-809-51	Resistor, 120 Ohm 1/6W 5%	S
R126	1-247-855-51	Resistor, 10K 1/6W 5%	S
R153	1-214-581-11	Resistor, 10K 1/8W 1%	S
R154	1-214-569-11	Resistor, 3.3K 1/8W 1%	S
R156	1-214-581-11	Resistor, 10K 1/8W 1%	S
R157	1-214-569-11	Resistor, 3.3K 1/8W 1%	S
R167-168	1-247-863-51	Resistor, 22K 1/6W 5%	S
RV4	T-9413-726-1	Potentiometer, 2DK, 100K Linear	S
RV 7	T-9412-122-1	Potentiometer, 5K Linear	S
RV9	T-9413-528-1	Potentiometer, 2DK Linear	S
S5	T-9413-507-1	Switch, PC Mount	S
S6 & S8	T-9413-512-1	Switch, Group	S
S9 & S12	T-9413-511-1	Switch, Group	S
S16-19	T-9413-633-1	Switch, Group	S
S20-22	T-9413-514-1	Switch, Group	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Group Module Sub-Board (GPS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C36	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C37	T-9410-963-1	Capacitor, 0.39uF/100V Poly	S
C38	T-9410-958-1	Capacitor, 0.15uF/100V Poly	S
C39-41	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C53-54	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C63-64	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C65-69	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C70-71	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
IC10 & 12	8-759-990-72	IC TL072	S
R58-59	1-247-837-51	Resistor, 1.8K 1/6W 5%	S
R60	1-247-855-51	Resistor, 10K 1/6W 5%	S
R61-65	1-247-879-51	Resistor, 100K 1/6W 5%	S
R66-67	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R68-69	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R71	1-247-855-51	Resistor, 10K 1/6W 5%	S
R72	1-247-879-51	Resistor, 100K 1/6W 5%	S
R73-74	1-247-809-51	Resistor, 120 ohm 1/6W 5%	S
R75	1-247-879-51	Resistor, 100K 1/6W 5%	S
R108-109	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S

Ref. No.	SONY Part No.	Description	Serv. Code
R110-112	1-247-879-51	Resistor, 100K 1/6W 5%	S
RV9	T-9413-527-1	Potentiometer, 100K,Linear, Ctr/Detent	S
RV10	T-9413-532-2	Potentiometer, 5K, Rev Lov	S
RV11	T-9412-122-1	Potentiometer, 5K Linear, CTR/Detent	S
RV13	T-9413-525-2	Potentiometer, 5K, REV LOG, 1DK, PC MT	S
S1	T-9413-531-1	Switch, 6PDT, ALT ACT, PC MT	S
S5-7	T-9413-679-1	Switch Bank, 3POS DPDT INTRL	S
S9	T-9413-508-1	Switch, 4PDT, MOM, PC MT	S
S10 & 15	T-9413-511-1	Switch, GP, 2STA, DPDT, ALT ACT	S
TP3 & 10-11	3-657-235-01	Test Point	U
W1-2	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W3	T-9412-097-1	Flex Ribbon Jumper 10 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Dynamics Board (DYS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
RV101	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV102-103	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV104-105	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV201	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV202-203	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV204-205	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV301	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV302-303	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV305	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV401	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV402-403	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV404-405	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S

Ref. No.	SONY Part No.	Description	Serv. Code
W101	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W201	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W301	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W401	T-9412-014-1	Flex Ribbon Jumper 18 pin	O

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Stereo Output Module (SOM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C2	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C3-4	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C5-6	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C7	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C8	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C9	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C10-11	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C12-13	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C14	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C16	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C17-18	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C19-20	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C21	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C23	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C24-25	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C26-27	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C28	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C29	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C30	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C31	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C32-33	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C34	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C35	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C36	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C37	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C38	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C39-40	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C41	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C42	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C43-44	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C45-46	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C47	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C48-49	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C50-51	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C52	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C53-54	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C55	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C57	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C58-62	1-123-621-11	Capacitor, 10uf/25V Electrolytic	S
C63-64	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C65	1-123-621-11	Capacitor, 10uf/25V Electrolytic	S
CNP1	1-560-300-11	Connector, IL-3P-S3EN2-1	S
CNP2-3	1-560-301-11	Connector, IL-4P-S3EN2-1	S
CNP4-5	T-9413-570-1	Connector, 15 pin, SIP, PC Mount	O
	T-9411-075-1	Connector, 14 pin Skt Open Frame	O
	T-9411-074-1	Connector, 8 pin Skt Open Frame	O
D1-7	8-719-991-40	Diode, 1N914	S
D18-21	8-719-305-15	Diode, J4	S
IC1	T-9412-432-2	ACN IV Hybrid	S
IC2	T-9412-433-1	Hybrid (LO)	S
IC3	T-9412-432-2	ACN IV Hybrid	S
IC4	T-9412-433-1	Hybrid (LO)	S
IC5	T-9412-432-2	ACN IV Hybrid	S
IC6	T-9412-433-1	Hybrid (LO)	S
IC7	T-9412-432-2	ACN IV Hybrid	S
IC8	T-9412-433-1	Hybrid (LO)	S
IC9	T-9412-432-2	ACN IV Hybrid	S
IC10	T-9412-433-1	Hybrid (LO)	S
IC11	T-9412-432-2	ACN IV Hybrid	S
IC12-15	T-9412-433-1	Hybrid (LO)	S
IC16	8-759-000-99	IC 74HC74	S
IC17	8-759-178-15	Voltage Regulator POS 7815T0220	S
IC18	8-759-179-15	Voltage Regulator KEG 7915T0220	S
IC19	8-759-990-72	IC TL072	S
JW1-7	1-560-733-11	Jumper-Pins	O
JW3 & JW6	1-560-832-11	Jumper-Socket	S
JW8-17	1-560-733-11	Jumper-Pins	O
JW8-15	1-560-832-11	Jumper-Socket	S
K1-2	T-9412-099-1	Relay, DS2E-M-DC24V	S
Q3-8	8-729-131-04	Transistor 2N3904	S
R1	1-214-592-11	Resistor, 30K 1/8W 1%	S
R2	1-247-879-51	Resistor, 100K 1/6W 5%	S
R4	1-247-855-51	Resistor, 10K 1/6W 5%	S
R5	1-247-859-51	Resistor, 15K 1/6W 5%	S
R7-8	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R9-10	1-247-879-51	Resistor, 100K 1/6W 5%	S
R11-12	1-247-859-51	Resistor, 15K 1/6W 5%	S
R13	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R14	1-214-592-11	Resistor, 30K 1/8W 1%	S
R15	1-247-879-51	Resistor, 100K 1/6W 5%	S
R17	1-247-855-51	Resistor, 10K 1/6W 5%	S
R18	1-247-859-51	Resistor, 15K 1/6W 5%	S
R20-21	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R22-23	1-247-879-51	Resistor, 100K 1/6W 5%	S
R24-25	1-247-859-51	Resistor, 15K 1/6W 5%	S
R26	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R27	1-214-592-11	Resistor, 30K 1/8W 1%	S
R28	1-247-879-51	Resistor, 100K 1/6W 5%	S
R30	1-247-855-51	Resistor, 10K 1/6W 5%	S
R31	1-247-859-51	Resistor, 15K 1/6W 5%	S
R33-34	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R35-36	1-247-879-51	Resistor, 100K 1/6W 5%	S
R37-38	1-247-859-51	Resistor, 15K 1/6W 5%	S
R39	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R40	1-214-592-11	Resistor, 30K 1/8W 1%	S
R41	1-247-879-51	Resistor, 100K 1/6W 5%	S
R43	1-247-855-51	Resistor, 10K 1/6W 5%	S
R44	1-247-859-51	Resistor, 15K 1/6W 5%	S
R46-47	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R48-49	1-247-879-51	Resistor, 100K 1/6W 5%	S
R50-51	1-247-859-51	Resistor, 15K 1/6W 5%	S
R52	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R55	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R56	1-247-879-51	Resistor, 100K 1/6W 5%	S
R57	1-247-859-51	Resistor, 15K 1/6W 5%	S
R59	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R60	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R61	1-247-855-51	Resistor, 10K 1/6W 5%	S
R62-63	1-247-879-51	Resistor, 100K 1/6W 5%	S
R64-65	1-247-859-51	Resistor, 15K 1/6W 5%	S
R67	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R68	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R69-70	1-247-879-51	Resistor, 100K 1/6W 5%	S
R72-73	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R74	1-247-855-51	Resistor, 10K 1/6W 5%	S
R75-76	1-247-879-51	Resistor, 100K 1/6W 5%	S
R77-78	1-247-859-51	Resistor, 15K 1/6W 5%	S
R80	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R81	1-247-879-51	Resistor, 100K 1/6W 5%	S
R82	1-247-859-51	Resistor, 15K 1/6W 5%	S
R85-86	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R87	1-247-855-51	Resistor, 10K 1/6W 5%	S
R88	1-247-879-51	Resistor, 100K 1/6W 5%	S
R90-91	1-247-859-51	Resistor, 15K 1/6W 5%	S
R92	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R93	1-247-879-51	Resistor, 100K 1/6W 5%	S
R94	1-247-859-51	Resistor, 15K 1/6W 5%	S
R97-98	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R99	1-247-855-51	Resistor, 10K 1/6W 5%	S
R100-103	1-247-879-51	Resistor, 100K 1/6W 5%	S
R104	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R105-106	1-247-866-51	Resistor, 30K 1/6W 5%	S
R109	1-247-855-51	Resistor, 10K 1/6W 5%	S
R110-111	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R112	1-247-879-51	Resistor, 100K 1/6W 5%	S
R120-121	1-247-867-51	Resistor, 33K 1/6W 5%	S
R122	1-247-855-51	Resistor, 10K 1/6W 5%	S
R124-129	1-247-867-51	Resistor, 33K 1/6W 5%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Dynamics Board (DYS) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
RV101	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV102-103	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV104-105	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV201	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV202-203	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV204-205	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV301	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV302-303	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV305	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV401	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S
RV402-403	T-9413-526-2	Potentiometer, 100K, Linear, PC Mount	S
RV404-405	T-9413-523-2	Potentiometer, 5K, Linear, PC Mount	S

Ref. No.	SONY Part No.	Description	Serv. Code
W101	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W201	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W301	T-9412-014-1	Flex Ribbon Jumper 18 pin	O
W401	T-9412-014-1	Flex Ribbon Jumper 18 pin	O

SERVICE CODES:

S: Stock Parts — normally stocked for replacement purposes

O: Order Parts — orders will be processed, but allow for additional delivery time

U: *These parts are seldom required for routine service and are* not stocked

Master Module (SOM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C2	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C3-4	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C5-6	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C7	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C8	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C9	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C10-11	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C12-13	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C14	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C16	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C17-18	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C19-20	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C21	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C23	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C24-25	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C26-27	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C28	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C29	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C30	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C31	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C32-33	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C34	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C35	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C36	T-9413-579-1	Capacitor, 1000mf/6.3V 12.5X25	S
C37	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C38	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C39-40	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C41	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C42	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C43-44	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C45-46	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C47	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C48-49	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C50-51	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C52	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C53-54	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C55	T-9411-305-1	Capacitor, 30900pf/100V Ceramic	S
C57	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C58-62	1-123-621-11	Capacitor, 10uf/25V Electrolytic	S
C63-64	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C65	1-123-621-11	Capacitor, 10uf/25V Electrolytic	S
CNP1	1-560-300-11	Connector, IL-3P-S3EN2-1	S
CNP2-3	1-560-301-11	Connector, IL-4P-S3EN2-1	S
CNP4-5	T-9413-570-1	Connector, 15 pin, SIP, PC Mount	O
	T-9411-075-1	Connector, 14 pin Skt Open Frame	O
	T-9411-074-1	Connector, 8 pin Skt Open Frame	O
D1-7	8-719-991-40	Diode, 1N914	S
D18-21	8-719-305-15	Diode, J4	S
IC1	T-9412-432-2	ACN IV Hybrid	S
IC2	T-9412-433-1	Hybrid (LO)	S
IC3	T-9412-432-2	ACN IV Hybrid	S
IC4	T-9412-433-1	Hybrid (LO)	S
IC5	T-9412-432-2	ACN IV Hybrid	S
IC6	T-9412-433-1	Hybrid (LO)	S
IC7	T-9412-432-2	ACN IV Hybrid	S
IC8	T-9412-433-1	Hybrid (LO)	S
IC9	T-9412-432-2	ACN IV Hybrid	S
IC10	T-9412-433-1	Hybrid (LO)	S
IC11	T-9412-432-2	ACN IV Hybrid	S
IC12-15	T-9412-433-1	Hybrid (LO)	S
IC16	8-759-000-99	IC 74HC74	S
IC17	8-759-178-15	Voltage Regulator POS 7815T0220	S
IC18	8-759-179-15	Voltage Regulator KEG 7915T0220	S
IC19	8-759-990-72	IC TL072	S
JW1-7	1-560-733-11	Jumper-Pins	O
JW3 & JW6	1-560-832-11	Jumper-Socket	S
JW8-17	1-560-733-11	Jumper-Pins	O
JW8-15	1-560-832-11	Jumper-Socket	S
K1-2	T-9412-099-1	Relay, DS2E-M-DC24V	S
Q3-8	8-729-131-04	Transistor 2N3904	S
R1	1-214-592-11	Resistor, 30K 1/8W 1%	S
R2	1-247-879-51	Resistor, 100K 1/6W 5%	S
R4	1-247-855-51	Resistor, 10K 1/6W 5%	S
R5	1-247-859-51	Resistor, 15K 1/6W 5%	S
R7-8	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R9-10	1-247-879-51	Resistor, 100K 1/6W 5%	S
R11-12	1-247-859-51	Resistor, 15K 1/6W 5%	S
R13	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R14	1-214-592-11	Resistor, 30K 1/8W 1%	S
R15	1-247-879-51	Resistor, 100K 1/6W 5%	S
R17	1-247-855-51	Resistor, 10K 1/6W 5%	S
R18	1-247-859-51	Resistor, 15K 1/6W 5%	S
R20-21	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R22-23	1-247-879-51	Resistor, 100K 1/6W 5%	S
R24-25	1-247-859-51	Resistor, 15K 1/6W 5%	S
R26	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R27	1-214-592-11	Resistor, 30K 1/8W 1%	S
R28	1-247-879-51	Resistor, 100K 1/6W 5%	S
R30	1-247-855-51	Resistor, 10K 1/6W 5%	S
R31	1-247-859-51	Resistor, 15K 1/6W 5%	S
R33-34	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R35-36	1-247-879-51	Resistor, 100K 1/6W 5%	S
R37-38	1-247-859-51	Resistor, 15K 1/6W 5%	S
R39	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R40	1-214-592-11	Resistor, 30K 1/8W 1%	S
R41	1-247-879-51	Resistor, 100K 1/6W 5%	S
R43	1-247-855-51	Resistor, 10K 1/6W 5%	S
R44	1-247-859-51	Resistor, 15K 1/6W 5%	S
R46-47	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R48-49	1-247-879-51	Resistor, 100K 1/6W 5%	S
R50-51	1-247-859-51	Resistor, 15K 1/6W 5%	S
R52	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R55	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R56	1-247-879-51	Resistor, 100K 1/6W 5%	S
R57	1-247-859-51	Resistor, 15K 1/6W 5%	S
R59	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R60	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R61	1-247-855-51	Resistor, 10K 1/6W 5%	S
R62-63	1-247-879-51	Resistor, 100K 1/6W 5%	S
R64-65	1-247-859-51	Resistor, 15K 1/6W 5%	S
R67	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R68	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R69-70	1-247-879-51	Resistor, 100K 1/6W 5%	S
R72-73	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R74	1-247-855-51	Resistor, 10K 1/6W 5%	S
R75-76	1-247-879-51	Resistor, 100K 1/6W 5%	S
R77-78	1-247-859-51	Resistor, 15K 1/6W 5%	S
R80	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R81	1-247-879-51	Resistor, 100K 1/6W 5%	S
R82	1-247-859-51	Resistor, 15K 1/6W 5%	S
R85-86	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R87	1-247-855-51	Resistor, 10K 1/6W 5%	S
R88	1-247-879-51	Resistor, 100K 1/6W 5%	S
R90-91	1-247-859-51	Resistor, 15K 1/6W 5%	S
R92	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R93	1-247-879-51	Resistor, 100K 1/6W 5%	S
R94	1-247-859-51	Resistor, 15K 1/6W 5%	S
R97-98	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R99	1-247-855-51	Resistor, 10K 1/6W 5%	S
R100-103	1-247-879-51	Resistor, 100K 1/6W 5%	S
R104	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R105-106	1-247-866-51	Resistor, 30K 1/6W 5%	S
R109	1-247-855-51	Resistor, 10K 1/6W 5%	S
R110-111	1-214-807-51	Resistor, 100 Ohm 1/6W 5%	S
R112	1-247-879-51	Resistor, 100K 1/6W 5%	S
R120-121	1-247-867-51	Resistor, 33K 1/6W 5%	S
R122	1-247-855-51	Resistor, 10K 1/6W 5%	S
R124-129	1-247-867-51	Resistor, 33K 1/6W 5%	S
RV1	T-9413-576-2	Potentiometer	S
RV2	T-9413-524-2	Potentiometer	S
RV3	T-9413-524-2	Potentiometer	S
RV4	T-9413-529-2	Potentiometer	S
S1	T-9413-507-1	Switch, PC Mount	S
S2	T-9413-507-1	Switch, PC Mount	S
S3	T-9413-507-1	Switch, PC Mount	S
S4	T-9413-507-1	Switch, PC Mount	S
S5	T-9413-506-1	Switch, PC Mount	S
S8	T-9413-495-1	Switch, Rotary	S
T1	T-9413-494-1	Transformer	S

Monitor Module (MMM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C2	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C3-4	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C5	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C6-16	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C17	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C18	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C19	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C20	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C21	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C22	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C23	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C24-25	T-9411-036-1	Capacitor, 220UF/16V Electrolytic	S
C26-31	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C32	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C33	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C34	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C35-36	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C37	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C38-43	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C44-45	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C46	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C47	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C48	1-123-621-11	Capacitor, 10UF/25V Electrolytic	S
C49	T-9411-323-1	Capacitor, 0.1UF/100V Ceramic	S
C50-53	T-9411-036-1	Capacitor, 220UF/16V Electrolytic	S
C54-57	1-123-621-11	Capacitor, 10UF/25V Electrolytic	S
C58	T-9411-278-1	Capacitor, 22PF/100V Ceramic	S
C59-61	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C62-77	T-9411-323-1	Capacitor, 0.1UF/100V Ceramic	S
C80-81 & C118-123	T-9411-039-1	Capacitor, 47UF/16V Electrolytic	S
C125-126	T-9411-323-1	Capacitor, 0.1UF/100V Ceramic	S
CNP1	1-560-309-11	CN IL-3P-S3GQ2-1	O
D1-4	8-719-305-15	Diode, J4	S
D1-7, D12-14, D21	8-719-991-40	Diode, 1914	S
IC1	8-759-900-72	IC NE5532AP T.I.	S
IC2-3	T-9412-433-1	HYBRID (LO)	S
IC4	8-759-990-72	IC TL072	S
IC5	T-9413-472-1	IC M5216P	S
IC6-10	8-759-990-72	IC TL072	S
IC11-12	8-759-178-15	Volt Reg Pos 7815T0220	S
IC21	8-759-990-72	IC TL072	S
JW11-14	1-560-733-11	Jumper-Pins	O
JW16-17	1-561-832-11	Jumper Socket	S

Ref. No.	SONY Part No.	Description	Serv. Code
K1	T-9412-099-1	Relay, DS2E-M-DC24V	S
K2-4	T-9410-051-1	Relay, NF4E-24V	S
K5	T-9412-099-1	Relay, DS2E-M-DC24V	S
Q1-9	8-729-139-04	Transistor, 2N3904	S
Q10	T-9410-172-1	Transistor, J111	S
Q11-14 & Q22-23	8-729-139-04	Transistor, 2N3904	S
R1-2	1-214-592-11	Resistor, 30K 1/8W 1%	S
R6	T-9411-799-1	Resistor, 19.1K 1/8W 1%	S
R7-8	T-9412-633-1	Resistor, 100 ohm 1W 5%	
R13	1-247-838-51	Resistor, 2K 1/6W 5%	S
R15	T-9411-799-1	Resistor, 19.1K 1/8W 1%	S
R21	1-247-838-51	Resistor, 2K 1/6W 5%	S
R24, R27, R30-37, & R39-40	1-247-855-51	Resistor, 10K 1/6W 5%	S
R42	1-247-831-51	Resistor, 1K 1/6W 5%	S
R43-44 & R47-48	1-247-855-51	Resistor, 10K 1/6W 5%	S
R51-54	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R57-59	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R60 & R63	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R71-74 & R76	1-247-855-51	Resistor, 10K 1/6W 5%	S
R77	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R84	1-210-825-11	Resistor, 3.3M 1.4W 5%	S
R86	1-247-879-51	Resistor, 30K 1/6W 5%	S
R87	1-247-855-51	Resistor, 10K 1/6W 5%	S
R88-91	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R93	1-247-855-51	Resistor, 10K 1/6W 5%	S
R98-99	1-247-831-51	Resistor, 1K 1/6W 5%	S
R164-167	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R172-175	1-214-592-11	Resistor, 30K 1/8W 1%	S
R176-179	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R182-184	1-247-855-51	Resistor, 10K 1/6W 5%	S
RV1-3	T-9413-529-2	Potentiometer, 5K,LOG,2DK	S
RV4	1-226-698-11	Potentiometer, 10K 18 Turn Top Adj	S
S1-10	T-9413-522-1	Switch, Group, 14STA,10 4PDT INTL	S
S17-20	T-9413-516-1	Switch, Group, 4STA,4PDT,INTL	S
S21-23	T-9413-522-1	Switch, Group, 14STA,10 4PDT INTL	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Communications Module (COM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	1-123-621-11	Capacitor, 10uF/25VR, Electrolytic	S
C5-6	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C7	T-9411-716-1	Capacitor, 47pF/100V, Ceramic	S
C8	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C9	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C10	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C11	T-9411-306-1	Capacitor, 4700pF/100V, Ceramic	S
C12-13	1-123-333-11	Capacitor, 100uF/25V, Electrolytic	S
C14	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C15	T-9411-283-1	Capacitor, 56pF/100V, Ceramic	S
C16	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C17	T-9410-995-1	Capacitor, 0.0068uF/100V, Mylar	S
C18	T-9410-964-1	Capacitor, 0.47uF/100V Poly	S
C19-20	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C21	T-9411-005-1	Capacitor, 0.047uF/100V Mylar	S
C22	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C23	T-9410-958-1	Capacitor, 0.15uF/100V Poly	S
C24	T-9411-008-1	Capacitor, 0.082uF/100V Mylar	S
C25-32	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C33-34	T-9411-061-1	Capacitor, 5pF/300V, Silver Mica	S
C35	T-9410-960-1	Capacitor, 0.22uF/100V Poly	S
C36	T-9411-001-1	Capacitor, 0.022uF/100V Mylar	S
C37	T-9410-989-1	Capacitor, 0.0022uF/100V Mylar	S
C38	1-123-307-11	Capacitor, 100uF/10V, Electrolytic	S
C39	T-9411-716-1	Capacitor, 47pF/100V, Ceramic	S
C40	T-9411-061-1	Capacitor, 5pF/300V Silver Mica	S
C41	T-9410-960-1	Capacitor, 0.22uF/100V Poly	S
C42	T-9411-001-1	Capacitor, 0.022uF/100V Mylar	S
C43	T-9410-989-1	Capacitor, .0022uF/100V Mylar	S
C44	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C45	T-9410-997-1	Capacitor, 0.01uF/100V Mylar	S
C46	1-123-333-11	Capacitor, 100uF/25V, Electrolytic	S
C47	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C48-49	T-9410-960-1	Capacitor, 0.22uF/100V Poly	S
C50	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C51	T-9410-964-1	Capacitor, 0.47uF/100V Poly	S
C52	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C53	T-9411-278-1	Capacitor, 22pF/100V, Ceramic	S
C54	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C55-72	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C73	T-9411-039-1	Capacitor, 47uF/16V, Electrolytic	S
C74	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C75-6	T-9411-278-1	Capacitor, 22pF/100V, Ceramic	S
CNJ3	1-560-300-11	Connector, IL-3P-S3EN2-1	O
D1-4	8-719-305-15	Diode J4	S
D5-7	8-719-991-40	Diode 1N914	S
D8-9	T-9410-335-1	Diode 1N5223B	S
D10	T-9410-342-1	Diode 1N5243B	S
D11	8-719-991-40	Diode 1N914	S
D12	T-9410-338-1	Diode 1N5231B	S
D13-16	8-719-991-40	Diode 1N914	S
IC1	8-759-179-15	Voltage Regulator, NEG 7915T0220	S
IC1	8-759-900-72	IC NE5532AP T.I.	S
IC2	8-759-178-15	Voltage Regulator, POS 7815T0220	S
IC2-3	8-759-990-72	IC TL072	S
IC4	8-759-900-72	IC NE5532AP T.I.	S
IC5	8-759-990-72	IC TL072	S
IC6	8-759-905-55	IC NE555	S
IC7-8	8-759-990-72	IC TL072	S
IC11	8-759-990-04	IC TL074	S
IC12	T-9411-242-1	IC DG211	S
IC13	8-759-990-72	IC TL072	S
K1	T-9412-099-1	Relay DS2E-M-DC24V	S
Q1	T-9413-549-1	Transistor 2SK184	S
Q2	8-729-139-04	Transistor 2N3904	S
Q3	T-9410-105-1	Transistor 2N3906	S
R1	1-247-855-51	Resistor, 10K 1/6W 5%	S
R2	1-247-795-51	Resistor, 33 ohm 1/6W 5%	S
R3	1-247-887-51	Resistor, 220K 1/6W 5%	S
R4-6	1-247-831-51	Resistor, 1K 1/6W 5%	S
R7	1-247-855-51	Resistor, 10K 1/6W 5%	S
R8	1-247-879-51	Resistor, 100K 1/6W 5%	S
R9	1-247-855-51	Resistor, 10K 1/6W 5%	S
R10	1-247-863-51	Resistor, 22K 1/6W 5%	S
R11	1-247-831-51	Resistor, 1K 1/6W 5%	S
R12	T-9411-048-1	Resistor, 100K1/8W 1%	S
R13	1-214-568-11	Resistor, 3K 1/8W 1%	S
R14	1-214-557-11	Resistor, 1K 1/8W 1%	S
R15	T-9413-638-1	Resistor, 301 ohm 1/8W 1%	S
R16	1-247-862-51	Resistor, 20K 1/6W 5%	S
R17	1-247-879-51	Resistor, 100K 1/6W 5%	S
R18	1-214-568-11	Resistor, 3K 1/8W 1%	S
R19	1-247-831-51	Resistor, 1K 1/6W 5%	S
R20	1-247-879-51	Resistor, 100K 1/6W 5%	S
R21	1-247-836-51	Resistor, 1.6K 1/6W 5%	S
R22	1-247-839-51	Resistor, 2.2K 1/6W 5%	S
R23	1-247-887-51	Resistor, 220K 1/6W 5%	S
R24	1-247-838-51	Resistor, 2K 1/6W 5%	S
R25	1-247-879-51	Resistor, 100K 1/6W 5%	S
R26	1-247-831-51	Resistor, 1K 1/6W 5%	S
R27	1-247-879-51	Resistor, 100K 1/6W 5%	S
R28	1-247-859-51	Resistor, 15K 1/6W 5%	S
R29	1-247-879-51	Resistor, 100K 1/6W 5%	S
R30-38	1-247-831-51	Resistor, 1K 1/6W 5%	S
R39	1-247-865-51	Resistor, 27K 1/6W 5%	S
R40-42	1-247-855-51	Resistor, 10K 1/6W 5%	S
R43	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R44	1-247-879-51	Resistor, 100K 1/6W 5%	S
R45-50	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R51-54	1-247-866-51	Resistor, 30K 1/6W 5%	S
R55-56	1-247-879-51	Resistor, 100K 1/6W 5%	S
R57	1-247-855-51	Resistor, 10K 1/6W 5%	S
R58	1-247-879-51	Resistor, 100K 1/6W 5%	S
R59-61	1-247-855-51	Resistor, 10K 1/6W 5%	S
R62	1-247-846-51	Resistor, 4.3K 1/6W 5%	S
R63	1-247-887-51	Resistor, 120K 1/6W 5%	S
R64	1-247-850-51	Resistor, 6.2K 1/6W 5%	S
R65-66	1-247-855-51	Resistor, 10K 1/6W 5%	S
R67	1-247-887-51	Resistor, 120K 1/6W 5%	S
R68	1-247-846-51	Resistor, 4.3K 1/6W 5%	S
R69-72	1-247-871-51	Resistor, 47K 1/6W 5%	S
R73	1-247-855-51	Resistor, 10K 1/6W 5%	S
R74	1-247-865-51	Resistor, 27K 1/6W 5%	S
R75	1-247-855-51	Resistor, 10K 1/6W 5%	S
R76	1-247-838-51	Resistor, 2K 1/6W 5%	S
R77	1-247-855-51	Resistor, 10K 1/6W 5%	S
R78-79	1-247-887-51	Resistor, 220K 1/6W 5%	S
R80	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R81-82	1-247-870-51	Resistor, 43K 1/6W 5%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Communications Module (COM) Parts List
(Continued)

Ref. No.	SONY Part No.	Description	Serv. Code
R83	1-247-855-51	Resistor, 10K 1/6W 5%	S
R84	1-247-862-51	Resistor, 20K 1/6W 5%	S
R85-86	1-247-855-51	Resistor, 10K 1/6W 5%	S
R87	1-247-879-51	Resistor, 100K 1/6W 5%	S
R88	1-247-855-51	Resistor, 10K 1/6W 5%	S
R89-99	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R100	1-247-855-51	Resistor, 10K 1/6W 5%	S
R101	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R102	1-247-855-51	Resistor, 10K 1/6W 5%	S
R103-106	1-247-879-51	Resistor, 100K 1/6W 5%	S
R107-108	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R109	1-247-879-51	Resistor, 100K 1/6W 5%	S
R110	1-247-802-51	Resistor, 62 ohm 1/6W 5%	S
R111	1-247-855-51	Resistor, 10K 1/6W 5%	S
RV1	T-9413-524-2	Potentiometer, 5K, Log, IDK, PC Mount	S
RV2	T-9413-632-1	Potentiometer, 100K, Special Log	S
RV3	T-9413-527-1	Potentiometer, 100K, Linear Ctr Detent	S

Ref. No.	SONY Part No.	Description	Serv. Code
RV4	1-224-940-11	Potentiometer, 10K 1T Top Adjust	S
RV5	1-224-943-11	Potentiometer, 100K 1T Top Adjust	S
RV6	1-226-699-11	Potentiometer, 50K 18T Top Adjust	S
RV7	1-224-940-11	Potentiometer, 10K 1T Top Adjust	S
S1-7	T-9413-520-1	Switch, GP, 7STA, 6INT; 2,4,6 PDT	S
S8-17	T-9413-521-1	Switch, GP, 10STA, 4PDT, INTL, SP	S
S18-22	T-9413-518-1	Switch, GP, 5STA, DPDT, ALT ACT	S
TI	T-9413-518-1	Transformer	S
TH1	T-9413-548-1	Thermistor, RA Type	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Input/Output Module (IOM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	1-123-621-11	Capacitor, 10uF/25V Electrolytic	S
C5-6	T-9413-579-1	Capacitor, 1000mF/6.3V 12.5X25	S
C7-8	T-9410-960-1	Capacitor, 0.22uF/100V Poly	S
C9	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C10	T-9410-986-1	Capacitor, 0.0012uF/100V Mylar	S
C11	T-9411-005-1	Capacitor, 0.047uF/100V Mylar	S
C12	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C14	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C15	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C21	T-9411-037-1	Capacitor, 22uF/16V Electrolytic	S
C22-23	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C24	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C25-27	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C28-29	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C30-34	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C35	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C36	T-9411-310-1	Capacitor, 0.01uF/100V Ceramic	S
C38-40	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C41	T-9410-956-1	Capacitor, 0.1uF/100V Poly	S
C42-44	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C49	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C50 & 53	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C54	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C55-56	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C57-63	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C74	T-9411-310-1	Capacitor, 0.01uF/100V Ceramic	S
C78-79	T-9411-036-1	Capacitor, 220uF/16V Electrolytic	S
CNJ3 & 6	T-9413-570-1	Connector, 15 pin, SIP, PC Mount	O
CNJ11-12	1-560-310-11	Connector, IL-4P-S3GQ2-1	O
D1-4	8-719-305-15	Diode, J4	S
D5,7-11&16	8-719-991-40	Diode, 1N914	S
DS1	T-9410-044-1	LED, Red MV5074C	S
DS3	T-9410-049-1	LED, Yellow MV5374-C	S
DS6	T-9410-047-1	LED, Green MV5474C	S
DS7-8	T-9413-477-1	LED, LN228RP	S
DS11	T-9410-047-1	LED, Green MV5474C	S
IC1	T-9412-433-1	Hybrid (LO)	S
IC2 & 4-5	8-759-990-72	IC TL072	S
IC6	8-759-001-02	IC 74HC02	S
IC7	8-759-179-15	Voltage Regulator, KEG 7915T0220	S
IC8	8-759-178-15	Voltage Regulator, POS 7815T0220	S
IC9	8-759-990-72	IC TL072	S
JW1-21	1-560-733-11	Jumper-Pins	O
K1	T-9412-099-1	Relay DS2E-M-DC24V	S
Q1-4	8-729-139-04	Transistor 2N3904	S
Q5	T-9410-105-1	Transistor 2N3906	S
Q6-10	8-729-139-04	Transistor 2N3904	S
Q11	T-9410-105-1	Transistor 2N3906	S
Q12-19	8-729-139-04	Transistor 2N3904	S
R6	1-247-826-51	Resistor, 620 ohm 1/6W 5%	S
R7	T-9411-782-1	Resistor, 12.7K 1/8W 1%	S
R8	1-247-879-51	Resistor, 100K 1/6W 5%	S
R9	1-247-855-51	Resistor, 10K 1/6W 5%	S
R10	T-9411-705-1	Resistor, 6.34K 1/8W 1%	S
R11-12	1-214-576-11	Resistor, 6.2K 1/8W 1%	S
R13-14	T-9413-642-1	Resistor, 10.5K 1/8W 1%	S
R15	1-210-828-11	Resistor, 4.7M 1/4W 5%	S
R18	1-247-826-51	Resistor, 620 ohm 1/6W 5%	S
R26-27	1-247-879-51	Resistor, 100K 1/6W 5%	S
R28	1-247-855-51	Resistor, 10K 1/6W 5%	S
R29	1-247-862-51	Resistor, 20K 1/6W 5%	S
R30	1-214-583-11	Resistor, 12K 1/8W 1%	S
R35-46	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R47	1-247-344-51	Resistor, 3.6K 1/6W 5%	S
R48	1-247-840-51	Resistor, 2.4K 1/6W 5%	S
R49-50	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R51	1-247-879-51	Resistor, 100K 1/6W 5%	S
R52-56	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R57	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S
R58-59	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R60	T-9413-640-1	Resistor, 3.4K 1/8W 1%	S
R61	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R62-63	1-247-855-51	Resistor, 10K 1/6W 5%	S
R64	1-247-879-51	Resistor, 100K 1/6W 5%	S
R65	1-247-859-51	Resistor, 15K 1/6W 5%	S
R66	1-247-831-51	Resistor, 1K 1/6W 5%	S
R67	1-247-879-51	Resistor, 100K 1/6W 5%	S
R68	1-247-867-51	Resistor, 33K 1/6W 5%	S
R69	1-246-434-15	Resistor, 24 ohm 1/4W 5%	S
R70	1-247-879-51	Resistor, 100K 1/6W 5%	S
R71	1-244-873-11	Resistor, 1K 1/2W 5%	S
R72	1-247-855-51	Resistor, 10K 1/6W 5%	S
R80-81	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R82	1-247-879-51	Resistor, 100K 1/6W 5%	S
R83-84	1-247-855-51	Resistor, 10K 1/6W 5%	S
R85	1-247-871-51	Resistor, 47K 1/6W 5%	S
R86-89	1-247-855-51	Resistor, 10K 1/6W 5%	S
R90	1-247-903-51	Resistor, 1M 1/6W 5%	S
R91-96	1-247-855-51	Resistor, 10K 1/6W 5%	S
R97	T-9411-653-1	Resistor, 1.82K 1/8W 1%	S
R98	T-9413-637-1	Resistor, 60.4 ohm 1/8W 1%	S
R99	1-247-867-51	Resistor, 33K 1/6W 5%	S
R100	1-247-879-51	Resistor, 100K 1/6W 5%	S
R101-105	1-247-855-51	Resistor, 10K 1/6W 5%	S
R106	1-247-879-51	Resistor, 100K 1/6W 5%	S
R107-108	1-247-855-51	Resistor, 10K 1/6W 5%	S
R121-122	1-247-862-51	Resistor, 20K 1/6W 5%	S
R123	1-247-874-51	Resistor, 62K 1/6W 5%	S
R124	1-247-855-51	Resistor, 10K 1/6W 5%	S
R125-126	1-247-879-51	Resistor, 100K 1/6W 5%	S
R127-129	1-247-871-51	Resistor, 47K 1/6W 5%	S
R130	1-247-855-51	Resistor, 10K 1/6W 5%	S
R131	1-247-879-51	Resistor, 100K 1/6W 5%	S
R132	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R133	1-247-879-51	Resistor, 100K 1/6W 5%	S
R134	1-247-856-51	Resistor, 11K 1/6W 5%	S
RV1-2	T-9413-527-1	Potentiometer, 100K, 1DK,Ctr Detent	S
RV4	T-9413-523-2	Potentiometer, 5K, Linear, 1DK, PC Mount	S
RV6	T-9412-122-1	Potentiometer, 5K, Linear, Ctr Detent DU	S
RV7	T-9413-523-2	Potentiometer, 5K, Linear, 1DK, PC Mount	S
RV9	1-226-698-11	Potentiometer, 10K, 18T Top Adj	S
RV12	T-9413-524-2	Potentiometer, 5K, Log, 1DK, PC Mount	S
RV13-14	T-9413-525-2	Potentiometer,5K,Rev Log,1DK,PC Mount	S
RV16-17	T-9413-680-1	Potentiometer, 2K, 1T, Bottom Adj	S
S3-4	T-9413-513-1	Switch GP, 6PDT, INTL, PC Mount	S
S11&14-15	T-9413-514-1	Switch GP 3STA, DPDT, ALT ACT, PC Mount	S
S17 & 19	T-9413-509-1	Switch, 4PDT, ALT ACT, PC Mount	S
S20	T-9413-508-1	Switch, 4PDT, MOM, PC Mount	S
S22	T-9413-509-1	Switch, 4PDT, ALT ACT, PC Mount	S
S23-24	T-9413-495-1	Switch, Rotary	S
T1	T-9413-494-1	Transformer	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Stereo Input Module (SIM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
	T-9411-074-1	8P Socket, Open Frame	O
	T-9411-075-1	14P Socket, Open Frame	O
	T-9412-014-1	Flex Ribbon Jumper 18 Pin	O
	T-9412-544-1	Flex Ribbon Jumper 9 Pin	O
C1	T-9413-735-1	Capacitor, 1000mf/6.3V 12.5X20	S
C2	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C3	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C4-6	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C7	T-9410-986-1	Capacitor, 0.0012uf/100V Mylar	S
C8	T-9411-004-1	Capacitor, 0.0392uf/100V Mylar	S
C9	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C10-12	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C13	T-9411-305-1	Capacitor, 3900pf/100V Ceramic	S
C14-15	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C16	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C17	T-9411-037-1	Capacitor, 22uf/16V Electrolytic	S
C29	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C30-31	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C37	T-9410-997-1	Capacitor, 0.01uf/100V Mylar	S
C38-39	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C40	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C41	T-9411-310-1	Capacitor, 0.01uf/100V Ceramic	S
C42-45	1-123-621-11	Capacitor, 10uf/25v Electrolytic	S
C47-48	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C49	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C50-68	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C73-74	T-9411-037-1	Capacitor, 22uf/16V Electrolytic	S
C101	T-9413-735-1	Capacitor, 1000mf/6.3V 12.5X2	0
C102	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C103	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C104-105	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C106	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C107	T-9410-986-1	Capacitor, 0.0012uf/100V Mylar	S
C108	T-9411-004-1	Capacitor, 0.0392uf/100V Mylar	S
C109	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C110-111	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C113	T-9411-305-1	Capacitor, 3900pf/100V Ceramic	S
C114-115	T-9411-036-1	Capacitor, 220uf/16V Electrolytic	S
C116	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C129	T-9411-278-1	Capacitor, 22pf/100V Ceramic	S
C130-131	T-9411-039-1	Capacitor, 47uf/16V Electrolytic	S
C136-137	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
C138-140	T-9411-037-1	Capacitor, 22uf/16V Electrolytic	S
C142-143	T-9411-323-1	Capacitor, 0.1uf/100V Ceramic	S
CNJ3-4	T-9413-570-1	Connector 15P, SIP, PC Mount	O
CNJ6-7	T-9413-570-1	Connector 15P, SIP, PC Mount	O
CNJ8-9	1-560-310-11	Connector, IL-4P-S3GQ2-1	O
CNJ10	T-9413-473-1	Connector 10P, Open Pin Header	O
D1-D6	8-719-991-40	Diode, 1N914	S
D7	8-719-305-15	Diode, J4	S
D8	8-719-991-40	Diode, 1N914	S
D10-13	8-719-305-15	Diode, J4	S
D14-19	8-719-991-40	Diode, 1N914	S
DS4-5	T-9410-049-1	LED, Yellow MV5374-C	S
DS6	T-9410-047-1	LED, Green MV5474C	S
DS7	T-9410-044-1	LED, Red MV5074C	S
DS8-9	T-9413-477-1	LED, LN228RP	S
IC1	8-759-990-72	IC TL074	S
IC2	T-9412-433-1	Hybrid (LO)	S
IC4-8	8-759-990-04	IC TL074	S
IC9	8-759-001-02	IC 74HC02	S
IC10	8-759-179-15	Volt Regulator, Pos 7915T0220	S
IC11	8-759-178-15	Volt Regulator, Pos 7815T0220	S
IC14-15 & IC101	8-759-990-72	IC TL074	S
JW1-19 &	1-560-733-11	Jumper Pins	O
JW101-102	1-561-832-11	Jumper Socket	S
K1-2	T-9412-099-1	Relay DS2E-M-DC24V	S
Q1	8-729-139-04	Transistor, 2N3904	S
Q2	T-9410-105-1	Transistor, 2N3906	S
Q3-4	8-729-139-04	Transistor, 2N3904	S
Q5	T-9410-105-1	Transistor, 2N3906	S
Q6-9	8-729-139-04	Transistor, 2N3904	S
R1	1-247-879-51	Resistor, 100K 1/6W 5%	S
R2	1-247-857-51	Resistor, 12K 1/6W 5%	S
R3	1-247-862-51	Resistor, 20K 1/6W 5%	S
R4-5	1-247-850-51	Resistor, 6.2K 1/6W 5%	S
R6-7	T-9413-642-1	Resistor, 10.5K 1/8W 1%	S
R8	1-210-828-11	Resistor, 4.7M 1/4W 5%	S
R9	1-247-856-51	Resistor, 11K 1/6W 5%	S
R10	1-247-859-51	Resistor, 15K 1/6W 5%	S
R11	1-247-807-51	Resistor, 100 Ohm 1/6W 5%	S
R12-13	1-247-879-51	Resistor, 100K 1/6W 5%	S
R14-15	1-247-807-51	Resistor, 100 Ohm 1/6W 5%	S
R16	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R17	1-247-879-51	Resistor, 100K 1/6W 5%	S
R28-29 & R31	1-247-879-51	Resistor, 100K 1/6W 5%	S
R32	1-247-847-51	Resistor, 1.7K 1/6W 5%	S
R33	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R34	1-247-847-51	Resistor, 1.7K 1/6W 5%	S
R35	1-247-879-51	Resistor, 100K 1/6W 5%	S
R36-37	T-9411-668-1	Resistor, 2.55K 1/8W 1%	S
R38	1-247-879-51	Resistor, 100K 1/6W 5%	S
R39	1-247-855-51	Resistor, 10K 1/6W 5%	S
R40-43	1-247-855-51	Resistor, 10K 1/6W 5%	S
R44	1-247-831-51	Resistor, 1K 1/6W 5%	S
R45	1-247-855-51	Resistor, 10K 1/6W 5%	S
R46	1-247-879-51	Resistor, 100K 1/6W 5%	S
R47	1-247-855-51	Resistor, 10K 1/6W 5%	S
R48	1-247-879-51	Resistor, 100K 1/6W 5%	S
R49	1-247-792-51	Resistor, 24 Ohm 1/6 5%	S
R50	1-247-867-51	Resistor, 33K 1/6W 5%	S
R51	1-244-873-11	Resistor, 1K 1/2W 5%	S
R52	1-247-855-51	Resistor, 10K 1/6W 5%	S
R53	1-247-903-51	Resistor, 1M 1/6W 5%	S
R54-56	1-247-855-51	Resistor, 10K 1/6W 5%	S
R57-58	1-247-879-51	Resistor, 100K 1/6W 5%	S
R59	1-247-855-51	Resistor, 10K 1/6W 5%	S
R60-61	1-244-879-11	Resistor, 1.8K 1/2W 5%	S
R62	1-247-886-51	Resistor, 200K 1/6W 5%	S
R63	1-247-867-51	Resistor, 33K 1/6W 5%	S
R64	T-9413-637-1	Resistor, 60.4 Ohm 1/8W 1%	S
R65	1-247-879-51	Resistor, 100K 1/6W 5%	S
R66-67	1-247-855-51	Resistor, 10K 1/6W 5%	S
R68-75	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R76-79	1-247-859-51	Resistor, 15K 1/6W 5%	S
R80-85 & R96	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R97	1-247-847-51	Resistor, 1.7K 1/6W 5%	S
R101	1-247-879-51	Resistor, 100K 1/6W 5%	S
R102	1-247-857-51	Resistor, 12K 1/6W 5%	S
R103	1-247-862-51	Resistor, 20K 1/6W 5%	S
R104-105	1-247-850-51	Resistor, 6.2K 1/6W 5%	S
R106-107	T-9413-642-1	Resistor, 10.5K 1/8W 1%	S
R108	1-210-828-11	Resistor, 4.7M 1/4W 5%	S
R109	1-247-856-51	Resistor, 11K 1/6W 5%	S
R110	1-247-859-51	Resistor, 15K 1/6W 5%	S
R111	1-247-807-51	Resistor, 100 Ohm 1/6W 5%	S
R112-113	1-247-879-51	Resistor, 100K 1/6W 5%	S
R114-115	1-247-807-51	Resistor, 100 Ohm 1/6W 5%	S
R116	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R128	1-247-879-51	Resistor, 100K 1/6W 5%	S
R132	1-247-847-51	Resistor, 1.7K 1/6W 5%	S
R133	T-9411-695-1	Resistor, 4.99K 1/8W 1%	S
R134	1-247-847-51	Resistor, 1.7K 1/6W 5%	S
R135	1-247-879-51	Resistor, 100K 1/6W 5%	S
R136-137	1-247-855-51	Resistor, 10K 1/6W 5%	S
R138-139 & R150	1-247-879-51	Resistor, 100K 1/6W 5%	S
R161	T-9411-806-1	Resistor, 22.6K 1/8W 1%	S
R163	1-247-886-51	Resistor, 200K 1/6W 5%	S
R165	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R170-171	1-247-826-51	Resistor, 620 Ohm 1/6W 5%	S
R172	1-247-863-51	Resistor, 22K 1/6W 5%	S
RV1	T-9413-627-1	Potentiometer, 2DK, 5K External Shaft	S
RV2-3	T-9413-730-1	Potentiometer, Dual Linear 100K CD	S
RV6 & RV8	T-9413-626-1	Potentiometer, 5K Linear, External Shaft	S
RV10	T-9413-630-1	Potentiometer, 2DK, 5K LG, External Shaft	O
RV11	T-9413-629-1	Potentiometer, 2DK, 5K Lin, External Shaft	S
RV12	1-228-459-11	Potentiometer, 10K 1 Turn, Top Adj	S
RV13 & RV101	T-9413-680-1	Potentiometer, 2K, 1 Turn, Bottom Adj	S
S1-3	T-9413-625-1	Switch, Group	S
S4	T-9413-514-1	Switch, Group	S
S7	T-9413-509-1	Switch, 4PDT, PC Mount	S
S10	T-9413-514-1	Switch, Group	S
S11	T-9413-514-1	Switch, Group	S
S13	T-9413-508-1	Switch, 4PDT, PC Mount	S
S14-15	T-9413-509-1	Switch, 4PDT, PC Mount	S
SW1-2	T-9413-495-1	Switch, Rotary	S
T1 & T101	T-9413-494-1	Transformer	S

Group Module (GPM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C5	T-9410-986-1	Capacitor, 0.0012uF/100V Mylar	S
C6	T-9411-005-1	Capacitor, 0.047uF/100V Mylar	S
C7	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C8	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C9-11	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C12	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C13-14	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C15	T-9411-036-1	Capacitor, 220uF/16V Electrolytic	S
C16-17	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C18	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C19	T-9413-579-1	Capacitor, 1000mF/6.3V 12.5X25	S
C20	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C21	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C22-23	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C24	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C25-26	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C27	T-9411-310-1	Capacitor, 0.01uF/100V Ceramic	S
C28	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C29-30	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C31	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C32-35	1-123-621-11	Capacitor, 10uF/25V Electrolytic	S
C42-43	T-9411-036-1	Capacitor, 220uF/16V Electrolytic	S
C44-52	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C55-57	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C58	T-9411-307-1	Capacitor, 5600pF/100V Ceramic	S
C59-60	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C61-62	T-9411-298-1	Capacitor, 1000pF/100V Ceramic	S
C72-73	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C74-75	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C76-80	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C81-82	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C9-11	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
CNP1	1-560-310-11	Connector, IL-4P-S3GQ2-1	O
CNP2	1-560-313-11	Connector, IL-8P-S3GQ2-1	O
CNP3	T-9413-570-1	Connector, 15P, SIP, PC Mount	O
D2-5	8-719-991-40	Diode, 1N914	S
D7	8-719-991-40	Diode, 1N914	S
D8-11	8-719-305-15	Diode, J4	S
D12-15	8-719-991-40	Diode, 1N914	S
DS1-2	T-9413-477-1	LED, LN228RP	S
DS3	T-9419-047-1	LED, Green MV5474C	S
DS4	T-9410-049-1	LED, Yellow MV5374-C	S
DS5	T-9419-047-1	LED, Green MV5474C	S
DS6	T-9410-044-1	LED, Red MV5074C	S
IC1-2	8-759-990-72	IC TL072	S
IC3	T-9412-432-2	ACN IV Hybrid	S
IC4	T-9412-433-1	Hybrid (LO)	S
IC5	8-759-990-72	IC TL072	S
IC6	T-9412-563-1	IC 74C02	S
IC7-8	8-759-990-72	IC TL072	S
IC9	8-759-179-15	Voltage Regulator, KEG 7915T0220	S
IC11	8-759-178-15	Voltage Regulator, POS 7815T0220	S
IC13-14	8-759-990-72	IC TL072	S
JW1-42	1-560-733-11	Jumper Pins	O
JW2-3	1-561-832-11	Jumper Socket	S
JW5	1-561-832-11	Jumper Socket	S
JW7	1-561-832-11	Jumper Socket	S
JW9	1-561-832-11	Jumper Socket	S
JW13	1-561-832-11	Jumper Socket	S
JW17	1-561-832-11	Jumper Socket	S
JW23-25	1-561-832-11	Jumper Socket	S
JW28-29	1-561-832-11	Jumper Socket	S
JW31	1-561-832-11	Jumper Socket	S
JW36	1-561-832-11	Jumper Socket	S
JW38	1-561-832-11	Jumper Socket	S
JW40-42	1-561-832-11	Jumper Socket	S
K1	T-9413-729-1	FBR244ND024/02CS	S
L1-2	T-9412-802-1	Choke 220UH	S
Q1	T-9410-105-1	Transistor, 2N3906	S
Q2-3	8-729-139-04	Transistor, 2N3904	S
Q4	T-9410-105-1	Transistor, 2N3906	S
Q5	8-729-139-04	Transistor, 2N3904	S
R1-2	1-214-581-11	Resistor, 10K 1/8W 1%	S
R3	1-247-879-51	Resistor, 100K 1/6W 5%	S
R4	1-214-592-11	Resistor, 30K 1/8W 1%	S
R5	T-9411-789-1	Resistor, 15K 1/8W 1%	S
R6	1-247-850-51	Resistor, 6.2K 1/6W 5%	S
R7	T-9413-642-1	Resistor, 10.5K 1/8W 1%	S
R8	1-247-879-51	Resistor, 100K 1/6W 5%	S
R9	1-247-850-51	Resistor, 6.2K 1/6W 5%	S
R10	T-9413-642-1	Resistor, 10.5K 1/8W 1%	S
R11	1-210-828-11	Resistor, 4.7M 1/4W 5%	S
R12-13	1-247-879-51	Resistor, 100K 1/6W 5%	S
R14	T-9411-703-1	Resistor, 6.04K 1/8W 1%	S
R15	1-247-838-51	Resistor, 2K 1/6W 5%	S
R16	1-247-879-51	Resistor, 100K 1/6W 5%	S
R17-18	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R19-21	1-247-879-51	Resistor, 100K 1/6W 5%	S
R22-23	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R24	1-247-851-51	Resistor, 6.8K 1/6W 5%	S
R25	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R26	1-247-846-51	Resistor, 4.3K 1/6W 5%	S
R27	1-247-840-51	Resistor, 2.4K 1/6W 5%	S
R28	1-247-846-51	Resistor, 4.3K 1/6W 5%	S
R29	1-247-840-51	Resistor, 2.4K 1/6W 5%	S
R30	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R31-32	1-247-879-51	Resistor, 100K 1/6W 5%	S
R33-34	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R35	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R36	1-247-879-51	Resistor, 100K 1/6W 5%	S
R37	1-214-581-11	Resistor, 10K 1/8W 1%	S
R38	1-247-831-51	Resistor, 1K 1/6W 5%	S
R39	1-247-855-51	Resistor, 10K 1/6W 5%	S
R40	1-247-879-51	Resistor, 100K 1/6W 5%	S
R41	1-246-434-15	Resistor, 24 ohm 1/4W 5%	S
R42	1-247-867-51	Resistor, 33K 1/6W 5%	S
R43	1-247-879-51	Resistor, 100K 1/6W 5%	S
R44	1-244-873-11	Resistor, 1K 1/2W 5%	S
R45	1-247-855-51	Resistor, 10K 1/6W 5%	S
R45	1-247-879-51	Resistor, 100K 1/6W 5%	S
R46	1-247-855-51	Resistor, 10K 1/6W 5%	S
R47	1-247-813-51	Resistor, 180 ohm 1/6W 5%	S
R48	1-247-855-51	Resistor, 10K 1/6W 5%	S
R49-50	1-247-879-51	Resistor, 100K 1/6W 5%	S
R51	1-247-903-51	Resistor, 1M 1/6W 5%	S
R52	1-247-866-51	Resistor, 30K 1/6W 5%	S
R53	1-247-855-51	Resistor, 10K 1/6W 5%	S
R54	1-247-831-51	Resistor, 1K 1/6W 5%	S
R55	1-247-802-51	Resistor, 62 ohm 1/6W 5%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Group Module (GPM) Parts List (Continued)

Ref. No.	SONY Part No.	Description	Serv. Code
R56	1-247-867-51	Resistor, 33K 1/6W 5%	S
R57	1-247-856-51	Resistor, 11K 1/6W 5%	S
R70	1-247-858-51	Resistor, 13K 1/6W 5%	S
R76-81	1-247-845-51	Resistor, 3.9K 1/6W 5%	S
R82-83	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R84-87	T-9413-643-1	Resistor, 11.8K 1/8W 1%	S
R88-93	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R94-95	T-9411-684-1	Resistor, 3.74K 1/8W 1%	S
R96	1-247-879-51	Resistor, 100K 1/6W 5%	S
R97	1-247-879-51	Resistor, 100K 1/6W 5%	S
R98	1-247-855-51	Resistor, 10K 1/6W 5%	S
R99-106	1-247-879-51	Resistor, 100K 1/6W 5%	S
R107	1-247-855-51	Resistor, 10K 1/6W 5%	S
R113-114	1-247-879-51	Resistor, 100K 1/6W 5%	S
R115	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R116	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R117	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R118	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R119-120	1-247-826-51	Resistor, 620 ohm 1/6W 5%	S
R121	1-247-886-51	Resistor, 200K 1/6W 5%	S
R122-123	1-247-855-51	Resistor, 10K 1/6W 5%	S
R124-125	1-247-879-51	Resistor, 100K 1/6W 5%	S
R126-127	1-247-863-51	Resistor, 22K 1/6W 5%	S
RV1-2	T-9413-527-1	Potentiometer, 100K, 1DK, Ctr detent	S

Ref. No.	SONY Part No.	Description	Serv. Code
RV3	T-9413-524-2	Potentiometer, 5K, 1DK, Log PC Mount	S
RV4-5	T-9412-122-1	Potentiometer, 5K, Linear Ctr Detent	S
RV6	1-226-698-11	Potentiometer, 10K, 18T Top Adjust	S
RV7-8	T-9413-523-2	Potentiometer, 5K, Linear 1DK, PC Mount	S
RV15	1-224-937-11	Potentiometer, 1K, 1 Turn, Top Adjust	S
RV16-17	T-9413-680-1	Potentiometer, 2K, 1 Turn, Bottom Adj.	S
S2	T-9413-581-1	Switch, GP, 3STA, ALT ACT	S
S4	T-9413-509-1	Switch, 4PDT, ALT ACT, PC Mount	S
S8	T-9413-509-1	Switch, 4PDT, ALT ACT, PC Mount	S
S11-12	T-9413-581-1	Switch, GP, 3STA, ALT ACT	S
S13	T-9413-509-1	Switch, 4PDT, ALT ACT, PC Mount	S
S14	T-9413-508-1	Switch, 4DT, MOM, PC Mount	S
S16	T-9413-495-1	Switch, Rotary	S
T1	T-9413-494-1	Transformer	S
TP1-2	3-657-235-01	Test Point	U
TP4-9	3-657-235-01	Test Point	U
TP12-18	3-657-235-01	Test Point	U

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Dynamics Module (DYN) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	1-123-329-11	Capacitor, 10uF/25V, Electrolytic	S
C33-34	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C103	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C104	1-123-329-11	Capacitor, 10uF/25V, Electrolytic	S
C105-106	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C107	T-9411-034-1	Capacitor, 10uF/25V, Electrolytic	S
C108	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C109-110	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C111	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C112-127	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C128-132, & C149	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C204	1-123-329-11	Capacitor, 10uF/25V, Electrolytic	S
C207	T-9411-034-1	Capacitor, 10uF/25V, Electrolytic	S
C208	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C211	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C212-227	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C249	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C304	1-123-329-11	Capacitor, 10uF/25V, Electrolytic	S
C307	T-9411-034-1	Capacitor, 10uF/25V, Electrolytic	S
C308	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C311	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C312-327	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C349	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
C404	1-123-329-11	Capacitor, 10uF/25V, Electrolytic	S
C407	T-9411-034-1	Capacitor, 10uF/25V, Electrolytic	S
C408	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C411	T-9410-961-1	Capacitor, 0.27uF/100V Poly	S
C412-427	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C449	T-9411-286-1	Capacitor, 100pF/100V, Ceramic	S
D18-21	8-719-305-15	Diode J4	S
D101-103, D105-106, D201-203, D205-206, D301-303, D305-306, D401-403, & D405-406	8-719-991-40	Diode 1N914	S
DS101-103	T-9410-044-1	LED, Red MV5074C	S
DS104	T-9413-468-1	Display GL112H9	S
DS201-203	T-9410-044-1	LED, Red MV5074C	S
DS204	T-9413-468-1	Display GL112H9	S
DS301-303	T-9410-044-1	LED, Red MV5074C	S
DS304	T-9413-468-1	Display GL112H9	S
DS401-403	T-9410-044-1	LED, Red MV5074C	S
DS404	T-9413-468-1	Display GL112H9	S
IC1	8-759-179-15	Voltage Regulator NEG 7915T0220	S
IC2	8-759-178-15	Voltage Regulator POS 7815T0220	S
IC3	8-759-990-04	IC TL074	S
IC101	8-759-00-72	IC TL072	S
IC102	T-9413-469-1	IC IR2433	S
IC103-108	8-759-00-72	IC TL072	S
IC109-110	T-9413-467-1	IC SM2110	S
IC201	8-759-00-72	IC TL072	S
IC202	T-9413-469-1	IC IR2433	S
IC203-208	8-759-00-72	IC TL072	S
IC209-210	T-9413-467-1	IC SM2110	S
IC301	8-759-00-72	IC TL072	S
IC302	T-9413-469-1	IC IR2433	S
IC303-308	8-759-00-72	IC TL072	S
IC309-310	T-9413-467-1	IC SM2110	S
IC401	8-759-00-72	IC TL072	S
IC402	T-9413-469-1	IC IR2433	S
IC403-408	8-759-00-72	IC TL072	S
IC409-410	T-9413-467-1	IC SM2110	S
R101	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R102-103	1-247-879-51	Resistor, 100K 1/6W 5%	S
R104	1-247-883-51	Resistor, 150K 1/6W 5%	S
R105	1-247-901-51	Resistor, 820K 1/6W 5%	S
R106	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R107	T-9411-854-1	Resistor, 73.2K 1/8W 1%	S
R108	T-9411-847-1	Metal Resistor, 61.9K 1/8W 1%	S
R109	1-214-592-11	Resistor, 30K 1/8W 1%	S
R110	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R111, & 113-114	1-247-855-51	Resistor, 10K 1/6W 5%	S
R116	T-9411-662-1	Resistor, 2.21K 1/8W 1%	S
R117	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R118	1-214-581-11	Resistor, 10K 1/8W 1%	S
R119	1-214-561-11	Resistor, 1.5K 1/8W 1%	S
R120	1-214-557-11	Resistor, 1K 1/8W 1%	S
R121	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R122	T-9411-877-1	Resistor, 133K 1/8W 1%	O
R123	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R125	1-247-841-51	Resistor, 2.7K 1/6W 5%	S
R126	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R127-130	1-215-830-11	Resistor, 100K 1/8W 1%	S
R133	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R134	1-214-581-11	Resistor, 10K 1/8W 1%	S
R135	T-9411-813-1	Resistor, 26.7K 1/8W 1%	S
R136	T-9411-825-1	Resistor, 36.5K 1/8W 1%	O
R137	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R138	1-247-901-51	Resistor, 820K 1/6W 5%	S
R139	1-247-883-51	Resistor, 150K 1/6W 5%	S
R140	1-214-581-11	Resistor, 10K 1/8W 1%	S
R141	1-214-558-11	Resistor, 1.1K 1/8W 1%	S
R142	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R144	1-247-879-51	Resistor, 100K 1/6W 5%	S
R145	1-247-887-51	Resistor, 220K 1/6W 5%	S
R147	T-9411-626-1	Resistor, 1K 1/8W 1%	S
R148	T-9411-539-1	Resistor, 127 ohm 1/8W 1%	S
R149	1-214-557-11	Resistor, 1K 1/8W 1%	S
R150	T-9411-885-1	Metal Resistor, 162K 1/8W 1%	S
R151	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R152	T-9411-719-1	Metal Resistor, 8.06K 1/8W 1%	S
R153	1-246-426-15	Resistor, 11 ohm 1/4W 5%	S
R201	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R202-203	1-247-879-51	Resistor, 100K 1/6W 5%	S
R204	1-247-883-51	Resistor, 150K 1/6W 5%	S
R205	1-247-901-51	Resistor, 820K 1/6W 5%	S
R206	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R207	T-9411-854-1	Resistor, 73.2K 1/8W 1%	S
R208	T-9411-847-1	Metal Resistor, 61.9K 1/8W 1%	S
R209	1-214-592-11	Resistor, 30K 1/8W 1%	S
R210	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R211 & 213-214	1-247-855-51	Resistor, 10K 1/6W 5%	S
R216	T-9411-662-1	Resistor, 2.21K 1/8W 1%	S
R217	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R218	1-214-581-11	Resistor, 10K 1/8W 1%	S
R219	1-214-561-11	Resistor, 1.5K 1/8W 1%	S
R220	1-214-557-11	Resistor, 1K 1/8W 1%	S
R221	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R222	T-9411-877-1	Resistor, 133K 1/8W 1%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Dynamics Module (DYN) Parts List (Continued)

Ref. No.	SONY Part No.	Description	Serv. Code
R223	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R225	1-247-841-51	Resistor, 2.7K 1/6W 5%	S
R226	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R227-230	1-215-830-11	Resistor, 100K 1/8W 1%	S
R233	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R234	1-214-581-11	Resistor, 10K 1/8W 1%	S
R235	T-9411-813-1	Resistor, 26.7K 1/8W 1%	S
R236	T-9411-825-1	Resistor, 36.5K 1/8W 1%	S
R237	1-215-830-11	Resistor, 100K 1/8W 1%	S
R237	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R238	1-215-830-11	Resistor, 100K 1/8W 1%	S
R238	1-247-901-51	Resistor, 820K 1/6W 5%	S
R239	1-215-830-11	Resistor, 100K 1/8W 1%	S
R239	1-247-883-51	Resistor, 150K 1/6W 5%	S
R240	1-214-581-11	Resistor, 10K 1/8W 1%	S
R241	1-214-558-11	Resistor, 1.1K 1/8W 1%	S
R242	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R244	1-247-879-51	Resistor, 100K 1/6W 5%	S
R245	1-247-887-51	Resistor, 220K 1/6W 5%	S
R247	T-9411-626-1	Resistor, 1K 1/8W 1%	S
R248	T-9411-539-1	Resistor, 127 ohm 1/8W 1%	S
R249	1-214-557-11	Resistor, 1K 1/8W 1%	S
R250	T-9411-885-1	Metal Resistor, 162K 1/8W 1%	S
R251	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R252	T-9411-719-1	Metal Resistor, 8.06K 1/8W 1%	S
R253	1-246-426-15	Resistor, 11 ohm 1/4W 5%	S
R301	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R302-303	1-247-879-51	Resistor, 100K 1/6W 5%	S
R304	1-247-883-51	Resistor, 150K 1/6W 5%	S
R305	1-247-901-51	Resistor, 820K 1/6W 5%	S
R306	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R307	T-9411-854-1	Resistor, 73.2K 1/8W 1%	S
R308	T-9411-847-1	Metal Resistor, 61.9K 1/8W 1%	S
R309	1-214-592-11	Resistor, 30K 1/8W 1%	S
R310	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R311	1-247-855-51	Resistor, 10K 1/6W 5%	S
R313&314	1-247-855-51	Resistor, 10K 1/6W 5%	S
R316	T-9411-662-1	Resistor, 2.21K 1/8W 1%	S
R317	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R318	1-214-581-11	Resistor, 10K 1/8W 1%	S
R319	1-214-561-11	Resistor, 1.5K 1/8W 1%	S
R320	1-214-557-11	Resistor, 1K 1/8W 1%	S
R321	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R322	T-9411-877-1	Resistor, 133K 1/8W 1%	S
R323	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R325	1-247-841-51	Resistor, 2.7K 1/6W 5%	S
R326	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R330	1-215-830-11	Resistor, 100K 1/8W 1%	S
R333	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R334	1-214-581-11	Resistor, 10K 1/8W 1%	S
R335	T-9411-813-1	Resistor, 26.7K 1/8W 1%	S
R336	T-9411-825-1	Resistor, 36.5K 1/8W 1%	S
R337	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R338	1-247-901-51	Resistor, 820K 1/6W 5%	S
R339	1-247-883-51	Resistor, 150K 1/6W 5%	S
R340	1-214-581-11	Resistor, 10K 1/8W 1%	S
R341	1-214-558-11	Resistor, 1.1K 1/8W 1%	S
R342	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R344	1-247-879-51	Resistor, 100K 1/6W 5%	S
R345	1-247-887-51	Resistor, 220K 1/6W 5%	S
R347	T-9411-626-1	Resistor, 1K 1/8W 1%	S
R348	T-9411-539-1	Resistor, 127 ohm 1/8W 1%	S
R349	1-214-557-11	Resistor, 1K 1/8W 1%	S
R350	T-9411-885-1	Metal Resistor, 162K 1/8W 1%	S

Ref. No.	SONY Part No.	Description	Serv. Code
R351	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R352	T-9411-719-1	Metal Resistor, 8.06K 1/8W 1%	S
R353	1-246-426-15	Resistor, 11 ohm 1/4W 5%	S
R401	1-247-852-51	Resistor, 7.5K 1/6W 5%	S
R402-403	1-247-879-51	Resistor, 100K 1/6W 5%	S
R404	1-247-883-51	Resistor, 150K 1/6W 5%	S
R405	1-247-901-51	Resistor, 820K 1/6W 5%	S
R406	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R407	T-9411-854-1	Resistor, 73.2K 1/8W 1%	S
R408	T-9411-847-1	Metal Resistor, 61.9K 1/8W 1%	S
R409	1-214-592-11	Resistor, 30K 1/8W 1%	S
R410	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R411 & 413-414	1-247-855-51	Resistor, 10K 1/6W 5%	S
R416	T-9411-662-1	Resistor, 2.21K 1/8W 1%	S
R417	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R418	1-214-581-11	Resistor, 10K 1/8W 1%	S
R419	1-214-561-11	Resistor, 1.5K 1/8W 1%	S
R420	1-214-557-11	Resistor, 1K 1/8W 1%	S
R421	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R422	T-9411-877-1	Resistor, 133K 1/8W 1%	S
R423	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R425	1-247-841-51	Resistor, 2.7K 1/6W 5%	S
R426	1-247-783-51	Resistor, 10 ohm 1/6W 5%	S
R427-430	1-215-830-11	Resistor, 100K 1/8W 1%	S
R433	T-9411-818-1	Metal Resistor, 30.1K 1/8W 1%	S
R434	1-214-581-11	Resistor, 10K 1/8W 1%	S
R435	T-9411-813-1	Resistor, 26.7K 1/8W 1%	S
R436	T-9411-825-1	Resistor, 36.5K 1/8W 1%	S
R437	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R438	1-247-901-51	Resistor, 820K 1/6W 5%	S
R439	1-247-883-51	Resistor, 150K 1/6W 5%	S
R440	1-214-581-11	Resistor, 10K 1/8W 1%	S
R441	1-214-558-11	Resistor, 1.1K 1/8W 1%	S
R442	1-214-578-11	Resistor, 7.5K 1/8W 1%	S
R444	1-247-879-51	Resistor, 100K 1/6W 5%	S
R445	1-247-887-51	Resistor, 220K 1/6W 5%	S
R447	T-9411-626-1	Resistor, 1K 1/8W 1%	S
R448	T-9411-539-1	Resistor, 127 ohm 1/8W 1%	S
R449	1-214-557-11	Resistor, 1K 1/8W 1%	S
R450	T-9411-885-1	Metal Resistor, 162K 1/8W 1%	S
R451	T-9411-516-1	Resistor, 10K 1/8W 1%	S
R452	T-9411-719-1	Metal Resistor, 8.06K 1/8W 1%	S
R453	1-246-426-15	Resistor, 11 ohm 1/4W 5%	S
RV106	1-228-462-11	Potentiometer, 100K 1T Top	S
RV107	1-228-457-11	Potentiometer, Variable 2K 1T	S
RV108 & 206	1-228-462-11	Potentiometer, 100K 1T Top	S
RV207	1-228-457-11	Potentiometer, Variable 2K 1T	S
RV208 & 306	1-228-462-11	Potentiometer, 100K 1T Top	S
RV307	1-228-457-11	Potentiometer, Variable 2K 1T	S
RV308 & 406	1-228-462-11	Potentiometer, 100K 1T Top	S
RV407	1-228-457-11	Potentiometer, Variable 2K 1T	S
RV408	1-228-462-11	Potentiometer, 100K 1T Top	S
S101-102, S201-202, S301-302, S401-402	T-9413-509-1	Switch, 4PDT, PC Mount	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Display Motherboard (DMB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-6	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C7-8	T-9413-584-1	Capacitor, 100uF/63V Electrolytic	S
CNJ1	T-9412-001-1	Connector, PS-16PE-D4T1-PN1	O
D1	8-719-991-40	Diode 1N914	S
DS1-5	T-9412-004-1	LED Display GL-112M9	S
IC1-5	T-9411-998-1	LED Driver 1R2432	S
R1-5	1-247-875-51	Resistor, 68K 1/6W 5%	S
R6-10	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R11	1-247-857-51	Resistor, 12K 1/6W 5%	S
R12-13	1-244-825-11	Resistor, 10 ohm 1/2W 5%	S
RV1-5	1-228-459-11	Potentiometer, 10K 1T Top	S
W1-2	T-9411-974-1	HDR PS-20PE-S4T1-PN1	O

SERVICE CODES:

S: **Stock Parts —** normally stocked for replacement purposes

O: **Order Parts —** orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Panel Meter Board (PMB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-4	1-123-621-11	Capacitor, 10uF/25V Electrolytic	S
C5	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C6	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C7-9	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C10	1-123-334-11	Capacitor, 220uF/25V Electrolytic	S
C11	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C12	1-123-334-11	Capacitor, 220uF/25V Electrolytic	S
C13-15	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C16	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C17	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C18	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C19-20	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C21	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C22-23	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C24	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C26-27	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C28	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C29-30	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C31	T-9411-278-1	Capacitor, 22pF/100V Ceramic	S
C32-33	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C34	1-123-608-11	Capacitor, 0.22uF/50V Electrolytic	S
C35	T-9411-038-1	Capacitor, 2.2uF/50V Electrolytic	S
C36	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C37	1-123-608-11	Capacitor, 0.22uF/50V Electrolytic	S
C38	T-9411-038-1	Capacitor, 2.2uF/50V Electrolytic	S
C40	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C41	1-123-608-11	Capacitor, 0.22uF/50V Electrolytic	S
C42	T-9411-038-1	Capacitor, 2.2uF/50V Electrolytic	S
C43	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C44	1-123-608-11	Capacitor, 0.22uF/50V Electrolytic	S
C45	T-9411-038-1	Capacitor, 2.2uF/50V Electrolytic	S
C46-51	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C52	T-9411-039-1	Capacitor, 47uF/16V Electrolytic	S
C53	T-9411-038-1	Capacitor, 2.2uF/50V Electrolytic	S
C54-63	T-9411-323-1	0.1uF/100V Ceramic	S
C64	1-123-608-11	0.22uF/50V Electrolytic	S
CNJ2	T-9412-001-1	Connector, PS-16PE-D4T1-PN1	O
CNJ3-5	T-9481-978-3	Cable Assembly, Mic	O
CNJ3-6	T-9413-473-1	Connector, 10 pin	O
D5-14	8-719-991-40	Diode, 1N914	S
D8-11	8-719-305-15	Diode, J4	S
IC1	8-759-171-12	Voltage Regulator, 7812T0220	S
IC2	T-9412-219-1	IC Reg MC7912	S
IC3	8-729-304-92	Transistor 2SB649A	S
IC4	8-759-112-38	IC UPC1238V	S
IC5-12	8-759-990-72	IC TL072	S
R1	1-247-855-51	Resistor, 10K 1/6W 5%	S
R2	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R3	1-247-855-51	Resistor, 10K 1/6W 5%	S
R4-5	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R6	1-247-185-11	Resistor, 2.7 ohm 1/2W 5%	S
R7	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R8	1-247-862-51	Resistor, 20K 1/6W 5%	S
R9	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R10	1-247-862-51	Resistor, 20K 1/6W 5%	S
R11	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R12	1-247-862-51	Resistor, 20K 1/6W 5%	S
R13	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R14	1-247-862-51	Resistor, 20K 1/6W 5%	S
R15	1-247-855-51	Resistor, 10K 1/6W 5%	S
R16	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R17	1-247-862-51	Resistor, 20K 1/6W 5%	S
R18	1-247-844-51	Resistor, 3.6K 1/6W 5%	S
R19	1-247-862-51	Resistor, 20K 1/6W 5%	S
R20-21	1-247-890-51	Resistor, 300K 1/6W 5%	S
R22	1-247-883-51	Resistor, 150K 1/6W 5%	S
R23	1-247-870-51	Resistor, 43K 1/6W 5%	S
R24-25	1-247-862-51	Resistor, 20K 1/6W 5%	S
R26	1-247-879-51	Resistor, 100K 1/6W 5%	S
R27-28	1-247-890-51	Resistor, 300K 1/6W 5%	S
R29	1-247-883-51	Resistor, 150K 1/6W 5%	S
R30	1-247-870-51	Resistor, 43K 1/6W 5%	S
R31-32	1-247-862-51	Resistor, 20K 1/6W 5%	S
R33	1-247-879-51	Resistor, 100K 1/6W 5%	S
R34-35	1-247-890-51	Resistor, 300K 1/6W 5%	S
R36	1-247-883-51	Resistor, 150K 1/6W 5%	S
R37	1-247-870-51	Resistor, 43K 1/6W 5%	S
R38-39	1-247-862-51	Resistor, 20K 1/6W 5%	S
R40	1-247-879-51	Resistor, 100K 1/6W 5%	S
R41-42	1-247-890-51	Resistor, 300K 1/6W 5%	S
R43	1-247-870-51	Resistor, 43K 1/6W 5%	S
R44	1-247-883-51	Resistor, 150K 1/6W 5%	S
R45-46	1-247-862-51	Resistor, 20K 1/6W 5%	S
R47	1-247-879-51	Resistor, 100K 1/6W 5%	S
R48-49	1-247-890-51	Resistor, 300K 1/6W 5%	S
R50	1-247-883-51	Resistor, 150K 1/6W 5%	S
R51	1-247-870-51	Resistor, 43K 1/6W 5%	S
R52-53	1-247-862-51	Resistor, 20K 1/6W 5%	S
R54	1-247-879-51	Resistor, 100K 1/6W 5%	S
RV1-6	1-228-530-11	Potentiometer, 100K 18T TOP	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

LED Display Board (LDB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1-6	T-9411-286-1	Capacitor, 100pF/100V Ceramic	S
DS1-2	T-9413-480-1	LED, Yellow LN0603YP4	S
DS3	T-9413-478-1	LED, Red LN0603RP2	S
DS4	T-9413-479-1	LED, Green LN0603GP3	S
DS5-6	T-9413-478-1	LED Red LN0603RP2	S
Q1-3	8-729-139-04	TRANSISTOR, 2N3904	S
Q4	T-9410-105-1	TRANSISTOR, 2N3906	S
Q5	8-729-139-04	TRANSISTOR, 2N3904	S
Q6	T-9410-105-1	TRANSISTOR, 2N3906	S
R1	1-247-879-51	Resistor, 100K 1/6W 5%	S
R2-4	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R5	1-247-879-51	Resistor, 100K 1/6W 5%	S
R6	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R7	1-247-879-51	Resistor, 100K 1/6W 5%	S
R8-9	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R10	1-247-879-51	Resistor, 100K 1/6W 5%	S
R11	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R12-13	1-247-807-51	Resistor, 100 ohm 1/6W 5%	S
R14	1-247-847-51	Resistor, 4.7K 1/6W 5%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Meter Input Board (MIB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
CNP5	T-9413-473-1	Connector, 10 Pin	O
JW1	1-560-733-11	Jumper Pins	O
JW2	1-560-733-11	Jumper Pins	O
R1	1-247-844-51	Resistor, 3.6K 1/6W 5%	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Peak Program Meter (PPM) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C1	T-9413-565-1	Capacitor, 0.47mF 100V 10%	O
C2-3	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C4	T-9411-292-1	Capacitor, 330pF/100V Ceramic	S
CNJ1	T-9413-473-1	Connector, 10 pin	O
D1-4	8-719-991-40	Diode, 1N914	S
IC1	8-759-990-04	IC TL074	S
IC2	T-9412-795-1	Transistor CA3083	S
JW1-2	1-560-733-11	Jumper-Pins	O
JW1	1-561-832-11	Jumper Socket	S
Q1	T-9410-105-1	Transistor 2N3906	S
R1-5	1-247-855-51	Resistor, 10K 1/6W 5%	S
R6	T-9413-641-1	Resistor, 3.65K 1/8W 1%	S
R7	1-210-821-11	Resistor, 2.2M 1/4 5%	S
R8-9	1-214-585-11	Resistor, 15K 1/8 1%	S
R10	T-9411-693-1	Resistor, 4.75K 1/8W 1%	S
R11	T-9411-845-1	Resistor, 59K 1/8W 1%	S
R12	1-214-585-11	Resistor, 15K 1/8 1%	S
R13	T-9411-832-1	Resistor, 43.2K 1/8W 1%	S
R14	T-9411-748-1	Resistor, 8.45K 1/8W 1%	S
R15	T-9411-622-1	Resistor, 909 ohm 1/8W 1%	S
R16	T-9411-621-1	Resistor, 887 ohm 1/8W 1%	S
R17	T-9411-567-1	Resistor, 243 ohm 1/8W 1%	S
R18	T-9411-606-1	Resistor, 619 ohm 1/8W 1%	S
R19	1-247-840-51	Resistor, 2.4K 1/6W 5%	S
R20-21	1-247-855-51	Resistor, 10K 1/6W 5%	S
R22	1-247-887-51	Resistor, 220K 1/6W 5%	S
R23	T-9411-708-1	Resistor, 6.81K 1/8W 1%	S
R24	1-215-822-11	Resistor, 47K 1/8W 1%	S
RV1	1-228-461-11	Potentiometer, 50K 1 Turn Top Adj	S
RV2-3	1-226-698-11	Potentiometer, 10K 18 Turn Top Adj	S
RV4	1-228-459-11	Potentiometer, 10K 1 Turn Top Adj	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Clock (CLK) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
B1	T-9413-327-1	Lithium Battery	O
C1-2	1-123-621-11	Capacitor, 10uF/25V, Electrolytic	S
C3	1-123-355-11	Capacitor, 4.7uF/50V, Electrolytic	S
C4	T-9411-300-1	Capacitor, 1500pF/100V Ceramic	S
C5	T-9411-228-1	Capacitor, 2805C00420GJ02F Vari-Cap	S
C6-7	T-9411-280-1	Capacitor, 33pF/100V, Ceramic	S
C8	T-9411-323-1	Capacitor, 0.1uF/100V, Ceramic	S
C9	1-123-611-11	Capacitor, 1.0uF/50V, Electrolytic	S
C10-11	1-123-335-11	Capacitor, 330mF/25V, Electrolytic	S
C12-13	1-123-307-11	Capacitor, 100uF/10V, Electrolytic	S
C14-15	1-123-308-11	Capacitor, 220uF/10V, Electrolytic	S
C16-17	1-123-307-11	Capacitor, 100uF/10V, Electrolytic	S
C18-24	T-9411-323-1	Capacitor, 0.1uF/100V Ceramic	S
C26	1-247-879-51	Capacitor, 100K 1/6W 5%	S
C27	1-247-879-51	Capacitor, 100K 1/6W 5%	S
CNJ1-4	T-9413-473-1	Connector, 10P Open Pin Header	O
CNJ2	T-9412-001-1	Connector, PS-16PE-D4T1-PN1	O
CNJ3	1-564-237-11	Connector, PS-26PE-D4T1-PN1	O
CNP1-2	1-560-885-11	Connector, PS-20SD-S4TS1-1	O
CNP3	T-9413-623-1	Connector, PS-16SD-D4TS1-1	O
D1	8-719-991-40	Diode 1N914	S
D2	T-9410-661-1	Diode 1N5238B	S
D3	T-9412-221-1	Diode Zener 1N5234	S
D4-6	8-719-991-40	Diode 1N914	S
IC1	8-759-202-86	IC 74HC123	S
IC1	T-9411-076-1	16-pin, Socket Open Frame	O
IC2	T-9411-075-1	14-pin, Socket Open Frame	O
IC2	T-9413-591-1	IC UPD1990AC	S
IC3	T-9413-592-1	IC UPD75CG28E	S
IC3	T-9413-595-1	42-pin, Socket Open Frame	O
IC4	8-759-909-33	IC LM311P T.I.	S
IC4	T-9411-074-1	8-pin, Socket Open Frame	O
IC5	8-759-202-74	IC 74HC04	S
IC5	T-9411-075-1	14-pin, Socket Open Frame	O
IC6	T-9411-077-1	18-pin, Socket Open Frame	O
IC6	T-9413-593-1	IC,MM74C922	S
IC7	8-759-001-30	IC 74HC139	S
IC7	T-9411-076-1	16-pin, Socket Open Frame	O
JW1-3	1-560-733-11	Jumper-Pins	O
JW3	1-561-832-11	Jumper Socket	S
L1-4	1-421-329-11	Choke Coil	S
Q2	T-9410-105-1	Transistor 2N3906	S
R1	1-247-855-51	Resistor, 10K 1/6W 5%	S
R2	1-247-879-51	Resistor, 100K 1/6W 5%	S
R3	1-247-831-51	Resistor, 1K 1/6W 5%	S
R4	1-210-821-11	Resistor, 2.2M 1/4W 5%	S
R5	1-247-879-51	Resistor, 100K 1/6W 5%	S
R6-7	1-247-855-51	Resistor, 10K 1/6W 5%	S
R8	1-247-835-51	Resistor, 1.5K 1/6W 5%	S
R9	1-246-517-15	Resistor, 68K 1/4W 5%	S
R10-12	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R17	1-247-867-51	Resistor, 33K 1/6W 5%	S
R18	1-247-869-51	Resistor, 39K 1/6W 5%	S
R19	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R20	1-247-867-51	Resistor, 33K 1/6W 5%	S
R21	1-247-862-51	Resistor, 20K 1/6W 5%	S
R22	1-247-879-51	Resistor, 100K 1/6W 5%	S
R23	1-247-847-51	Resistor, 4.7K 1/6W 5%	S
R24	1-247-843-51	Resistor, 3.3K 1/6W 5%	S
R25	1-247-879-51	Resistor, 100K 1/6W 5%	S
RN1-4	T-9412-084-1	Resistor Network, SIP	S
S1-17	T-9413-594-1	Switch, Micro, MIN, KSA01M	S
Y1	T-9411-227-1	Crystal, NTF3238	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Power Supply (PSU) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
C9	1-123-345-11	Capacitor, 100uF/35V Electrolytic	S
C10	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C12	1-123-329-11	Capacitor, 10uF/25V Electrolytic	S
C13	1-123-345-11	Capacitor, 100uF/35V Electrolytic	S
C14	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C16	1-123-329-11	Capacitor, 10uF/25V Electrolytic	S
C17	1-123-345-11	Capacitor, 100uF/35V Electrolytic	S
C18	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C20	1-123-329-11	Capacitor, 10uF/25V Electrolytic	S
C21	1-123-345-11	Capacitor, 100uF/35V Electrolytic	S
C22	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C25	1-123-355-11	Capacitor, 4.7uF/50V Electrolytic	S
C26	1-123-329-11	Capacitor, 10uF/25V Electrolytic	S
C27	1-123-611-11	Capacitor, 1.0uF/50V Electrolytic	S
D1-4	8-719-305-15	Diode, J4	S
R1	1-246-451-15	Resistor, 120 ohm 1/4W 5%	S
R2	1-246-460-15	Resistor, 300 ohm 1/4W 5%	S
R3	1-246-441-15	Resistor, M 1/4W 5%	S
R4	1-246-465-15	Resistor, 470 ohm 1/4W 5%	S
R5	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R6	1-246-451-15	Resistor, 120 ohm 1/4W 5%	[illegible]
R7	1-246-476-15	Resistor, 1.3K 1/4W 5%	[illegible]
R8	1-246-441-15	Resistor, 47 ohm 1/4W 5%	[illegible]
R9	1-244-879-11	Resistor, 1.8K 1/2W 5%	S
R10	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R11	1-246-451-15	Resistor, 120 ohm 1/4W 5%	S
R12	1-246-476-15	Resistor, 1.3K 1/4W 5%	S
R13	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R14	1-244-879-11	Resistor, 1.8K 1/2W 5%	S
R15	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R16	1-246-451-15	Resistor, 120 ohm 1/4W 5%	S
R17	1-246-460-15	Resistor, 300 ohm 1/4W 5%	S
R18	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R19	1-246-465-15	Resistor, 470 ohm 1/4W 5%	S
R20	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R21	1-246-451-15	Resistor, 120 ohm 1/4W 5%	S
R22	1-246-487-15	Resistor, 3.9K 1/4W 5%	S
R23	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
R24	1-244-889-11	Resistor, 4.7K 1/2W 5%	S
R25	1-246-441-15	Resistor, 47 ohm 1/4W 5%	S
RV1	1-224-935-11	Potentiometer, 200 ohm 1 Turn, Top Adj	S
RV2-3	1-224-936-11	Potentiometer, 500 ohm 1 Turn, Top Adj	S
RV4	1-224-935-11	Potentiometer, 200 ohm 1 Turn, Top Adj	S
RV5	1-224-937-11	Potentiometer, 1K 1 Turn Top Adj	S

SERVICE CODES:

S: **Stock Parts** — normally stocked for replacement purposes

O: **Order Parts** — orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

Beau Connector Board (BCB) Parts List

Ref. No.	SONY Part No.	Description	Serv. Code
CNP4	T-9413-563-1	PC Mount, S6-3318-ABT-07	O
	T-9413-564-1	Right Angle 09-66-1151	O

SERVICE CODES:

S: **Stock Parts** – normally stocked for replacement purposes

O: **Order Parts** – orders will be processed, but allow for additional delivery time

U: These parts are seldom required for routine service and are not stocked

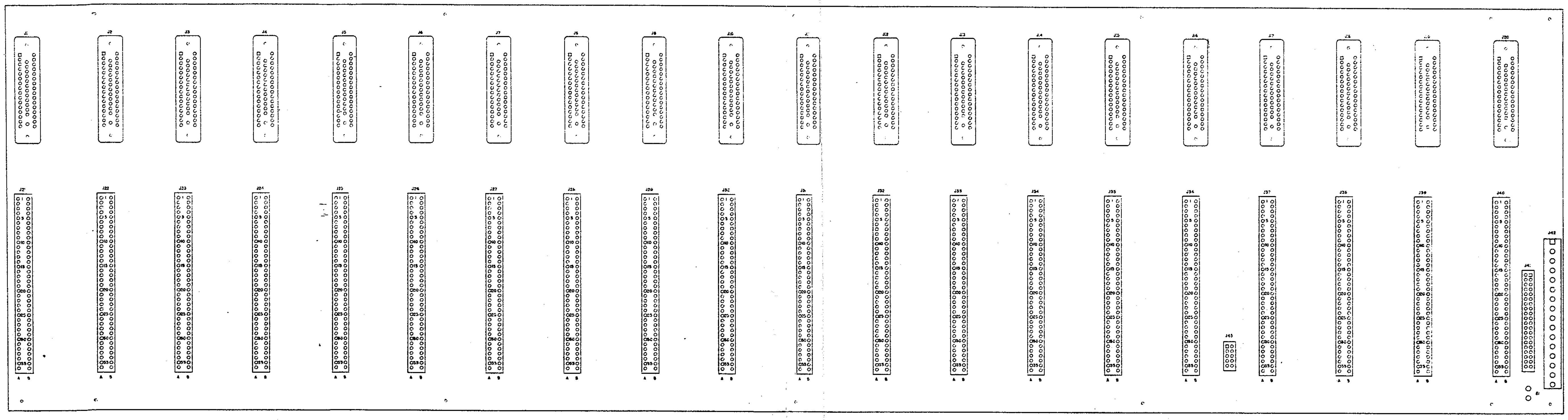
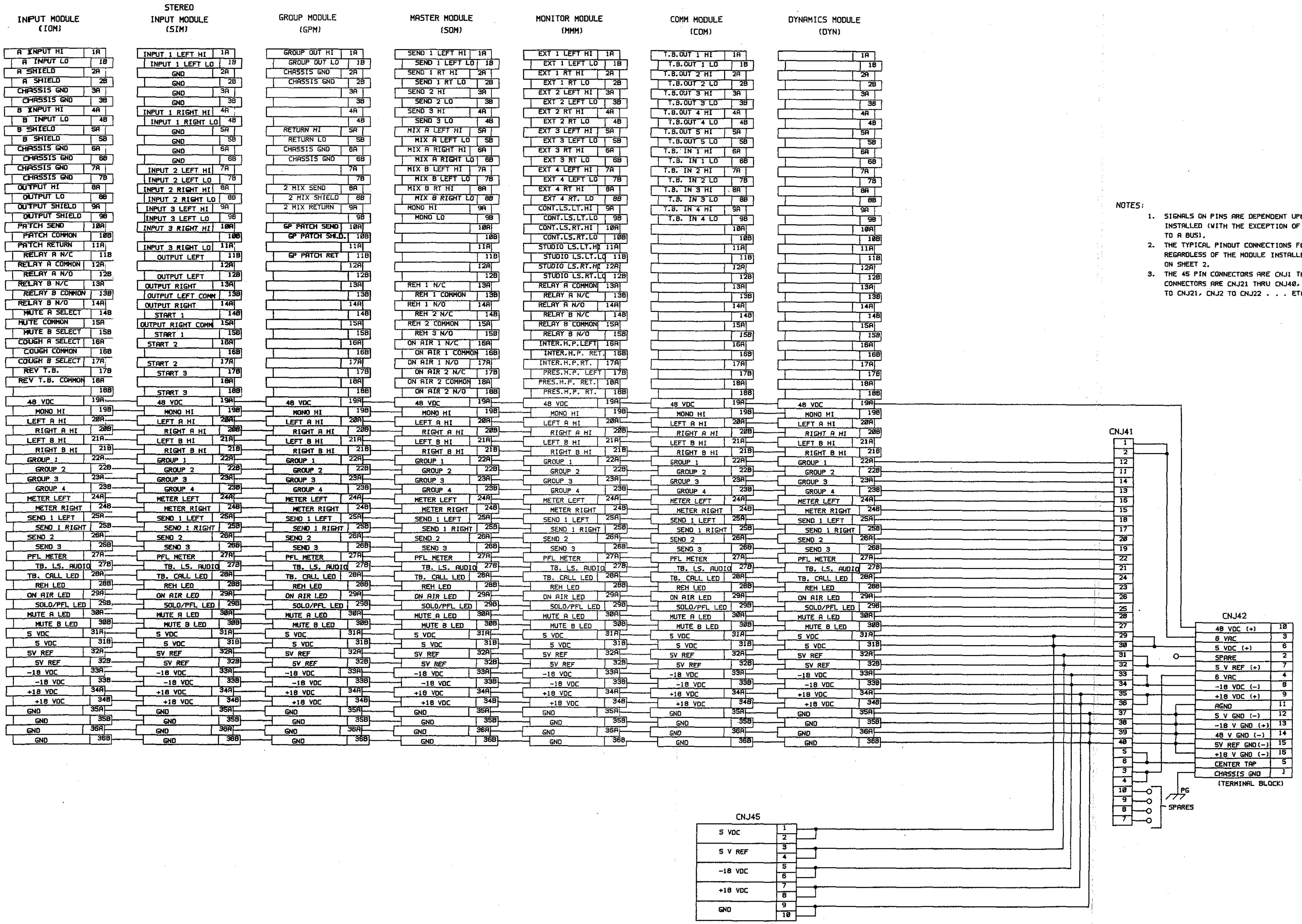


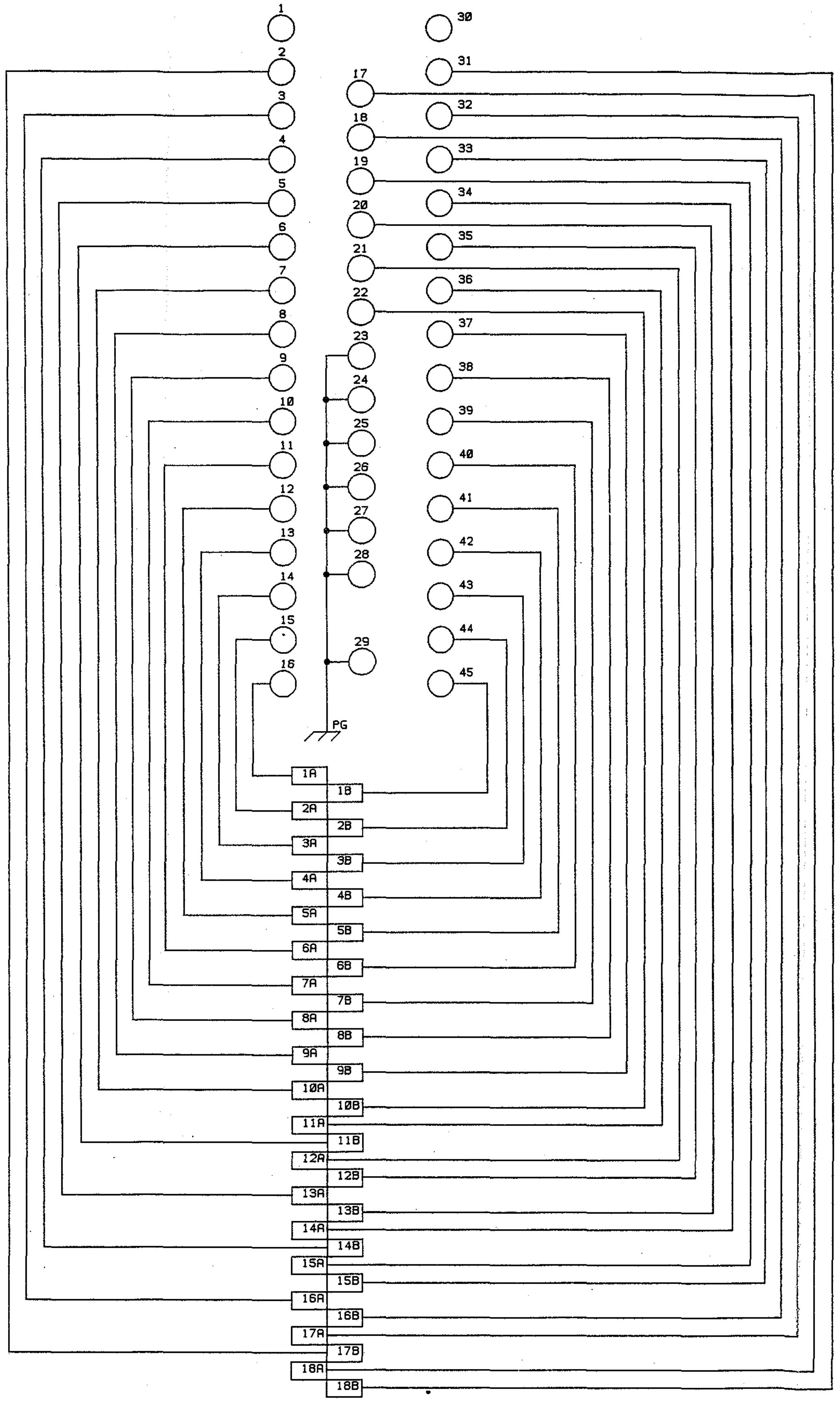
Figure 6-13. Mother Board A (MBA) Mechanical Assembly


INPUT MODULE (IOM)
STEREO INPUT MODULE (SIM)
GROUP MODULE (GPM)
MASTER MODULE (SOM)
MONITOR MODULE (MMM)
COMM MODULE (COM)
DYNAMICS MODULE (DYN)
CNJ41
CNJ42
48 VDC (+) 10
6 VAC 3
5 VDC (+) 6
SPARE 2
5 V REF (+) 7
6 VAC 4
-18 VDC (-) 8
+18 VDC (+) 9
AGND 11
5 V GND (-) 12
-18 V GND (+) 13
48 V GND (-) 14
5V REF GND(-) 15
+18 V GND (-) 16
CENTER TAP 5
CHASSIS GND 1
(TERMINAL BLOCK)
PG
SPARES
CNJ45
5 VDC
5 V REF
-18 VDC
+18 VDC
GND

NOTES:

1. SIGNALS ON PINS ARE DEPENDENT UPON THE MODULE INSTALLED (WITH THE EXCEPTION OF PINS CONNECTED TO A BUS).
2. THE TYPICAL PINOUT CONNECTIONS FOR EACH SLOT, REGARDLESS OF THE MODULE INSTALLED, ARE SHOWN ON SHEET 2.
3. THE 45 PIN CONNECTORS ARE CNJ1 THRU CNJ20, 72 PIN CONNECTORS ARE CNJ21 THRU CNJ40, WITH CNJ1 CONNECTED TO CNJ21, CNJ2 TO CNJ22 . . . ETC.

Figure 6-14. Mother Board A (MBA) Schematic (Sheet 1 of 2)


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
PG
1A
1B
2A
2B
3A
3B
4A
4B
5A
5B
6A
6B
7A
7B
8A
8B
9A
9B
10A
10B
11A
11B
12A
12B
13A
13B
14A
14B
15A
15B
16A
16B
17A
17B
18A
18B

THIS SHOWS THE TYPICAL PINOUT CONNECTIONS
FOR EACH SLOT (REGARDLESS OF MODULE INSTALLED)

Figure 6-14. Mother Board A (MBA) Schematic (Sheet 2 of 2)

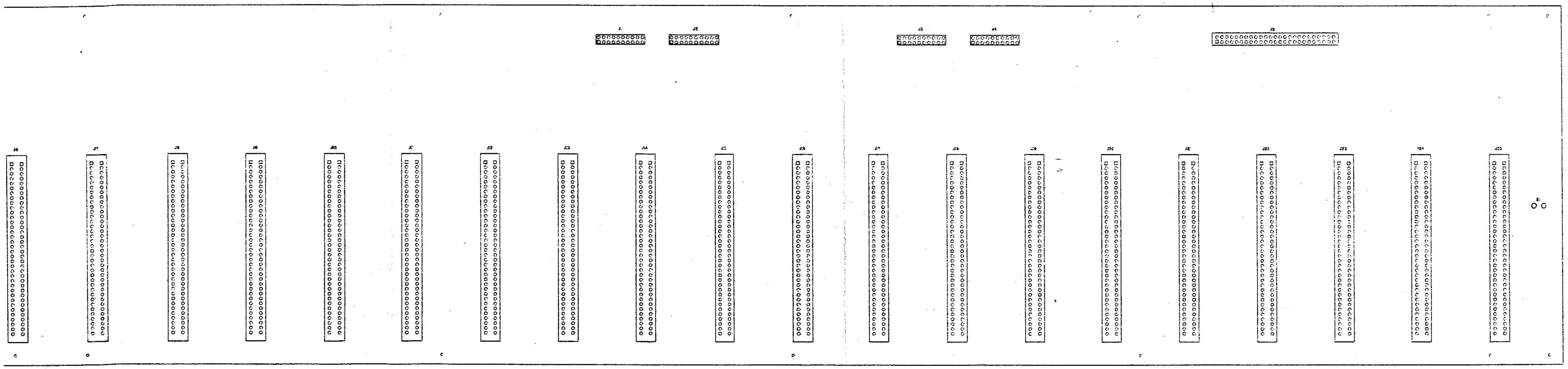
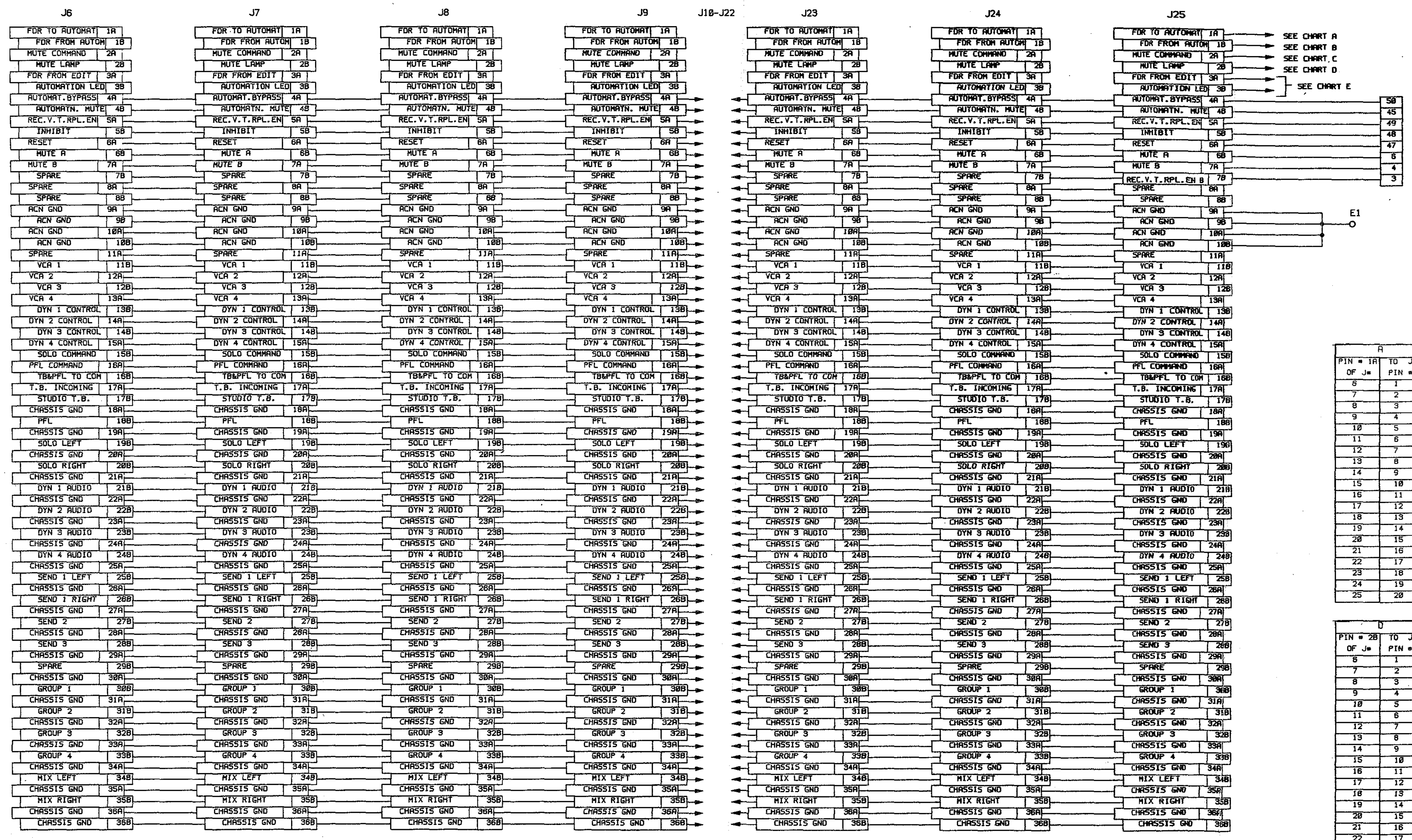

J2
J3
J4
J5
J6
J7
J9
J10
J12
J13
J14
J16
J17
J20
J22
J23
J24
J25

Figure 6-15. **Mother Board B (MBB) Mechanical Assembly**


J6
J7
J8
J9
J10-J22
J23
J24
J25
FDR TO AUTOMAT 1A
FDR FROM AUTOM 1B
MUTE COMMAND 2A
MUTE LAMP 2B
FDR FROM EDIT 3A
AUTOMATION LED 3B
AUTOMAT.BYPASS 4A
AUTOMATN. MUTE 4B
REC.V.T.RPL.EN 5A
INHIBIT 5B
RESET 6A
MUTE A 6B
MUTE B 7A
SPARE 7B
REC.V.T.RPL.EN B 7B
SPARE 8A
SPARE 8B
ACN GND 9A
ACN GND 9B
ACN GND 10A
ACN GND 10B
SPARE 11A
VCA 1 11B
VCA 2 12A
VCA 3 12B
VCA 4 13A
DYN 1 CONTROL 13B
DYN 2 CONTROL 14A
DYN 3 CONTROL 14B
DYN 4 CONTROL 15A
SOLO COMMAND 15B
PFL COMMAND 16A
TB&PFL TO COM 16B
T.B. INCOMING 17A
STUDIO T.B. 17B
CHASSIS GND 18A
PFL 18B
CHASSIS GND 19A
SOLO LEFT 19B
CHASSIS GND 20A
SOLO RIGHT 20B
CHASSIS GND 21A
DYN 1 AUDIO 21B
CHASSIS GND 22A
DYN 2 AUDIO 22B
CHASSIS GND 23A
DYN 3 AUDIO 23B
CHASSIS GND 24A
DYN 4 AUDIO 24B
CHASSIS GND 25A
SEND 1 LEFT 25B
CHASSIS GND 26A
SEND 1 RIGHT 26B
CHASSIS GND 27A
SEND 2 27B
CHASSIS GND 28A
SEND 3 28B
CHASSIS GND 29A
SPARE 29B
CHASSIS GND 30A
GROUP 1 30B
CHASSIS GND 31A
GROUP 2 31B
CHASSIS GND 32A
GROUP 3 32B
CHASSIS GND 33A
GROUP 4 33B
CHASSIS GND 34A
MIX LEFT 34B
CHASSIS GND 35A
MIX RIGHT 35B
CHASSIS GND 36A
CHASSIS GND 36B
SEE CHART A
SEE CHART B
SEE CHART C
SEE CHART D
SEE CHART E
50
45
49
48
47
6
4
3
E1

A		B		C	
PIN # 1A OF J#	TO J3 PIN #	PIN # 1B OF J#	TO J4 PIN #	PIN # 2A OF J#	TO J1 PIN #
6	1	6	1	6	1
7	2	7	2	7	2
8	3	8	3	8	3
9	4	9	4	9	4
10	5	10	5	10	5
11	6	11	6	11	6
12	7	12	7	12	7
13	8	13	8	13	8
14	9	14	9	14	9
15	10	15	10	15	10
16	11	16	11	16	11
17	12	17	12	17	12
18	13	18	13	18	13
19	14	19	14	19	14
20	15	20	15	20	15
21	16	21	16	21	16
22	17	22	17	22	17
23	18	23	18	23	18
24	19	24	19	24	19
25	20	25	20	25	20

D		E			
PIN # 2B OF J#	TO J2 PIN #	PIN # 3A OF J#	TO J5 PIN #	PIN # 3B OF J#	TO J5 PIN #
6	1	6	5	6	8
7	2	7	7	7	10
8	3	8	9	8	12
9	4	9	11	9	14
10	5	10	13	10	16
11	6	11	15	11	18
12	7	12	17	12	20
13	8	13	19	13	22
14	9	14	21	14	24
15	10	15	23	15	26
16	11	16	25	16	28
17	12	17	27	17	30
18	13	18	29	18	32
19	14	19	31	19	34
20	15	20	33	20	36
21	16	21	35	21	38
22	17	22	37	22	40
23	18	23	39	23	42
24	19	24	41	24	44
25	20	25	43	25	46

Figure 6-16. Mother Board B (MBB) Schematic

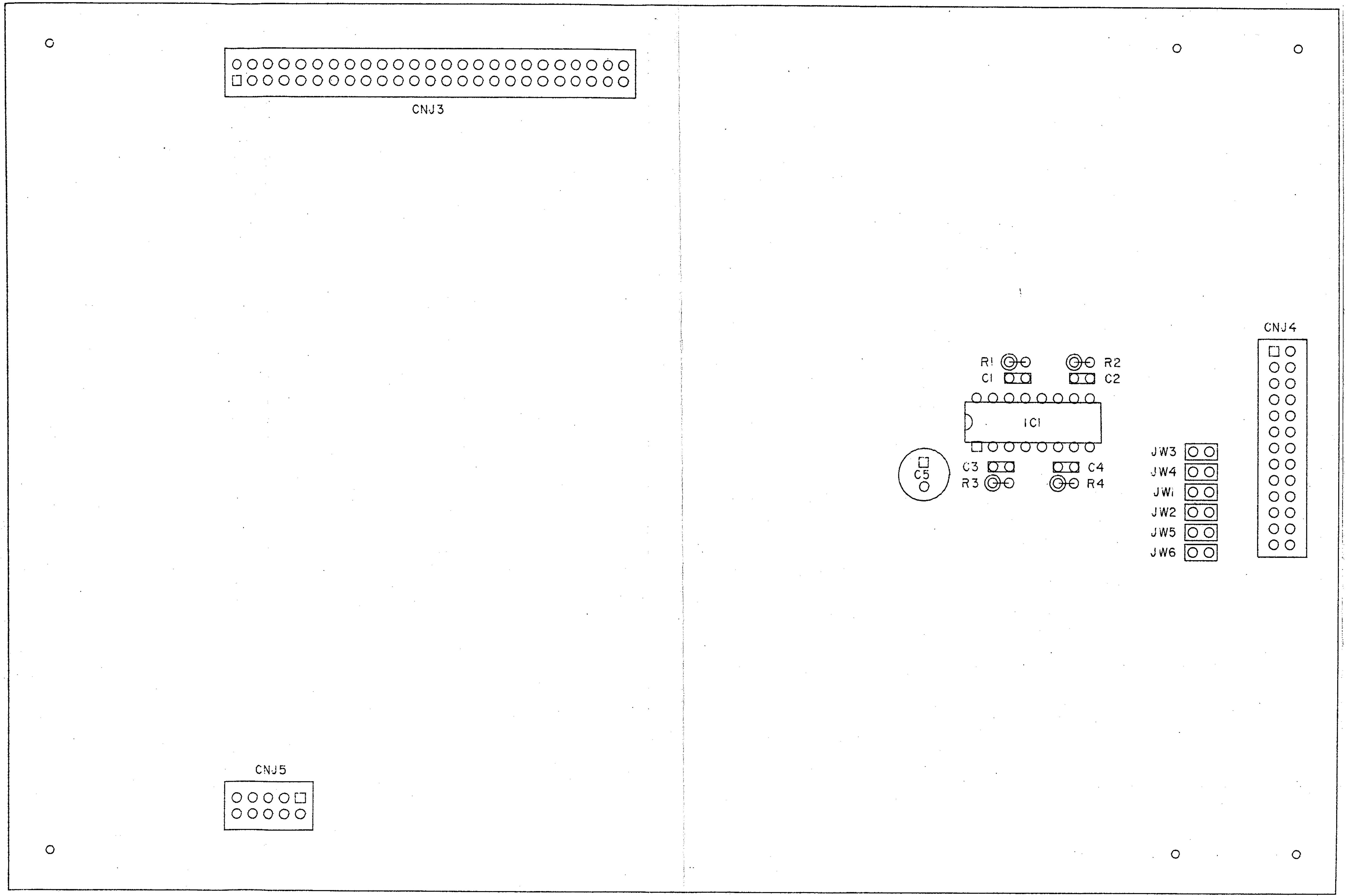
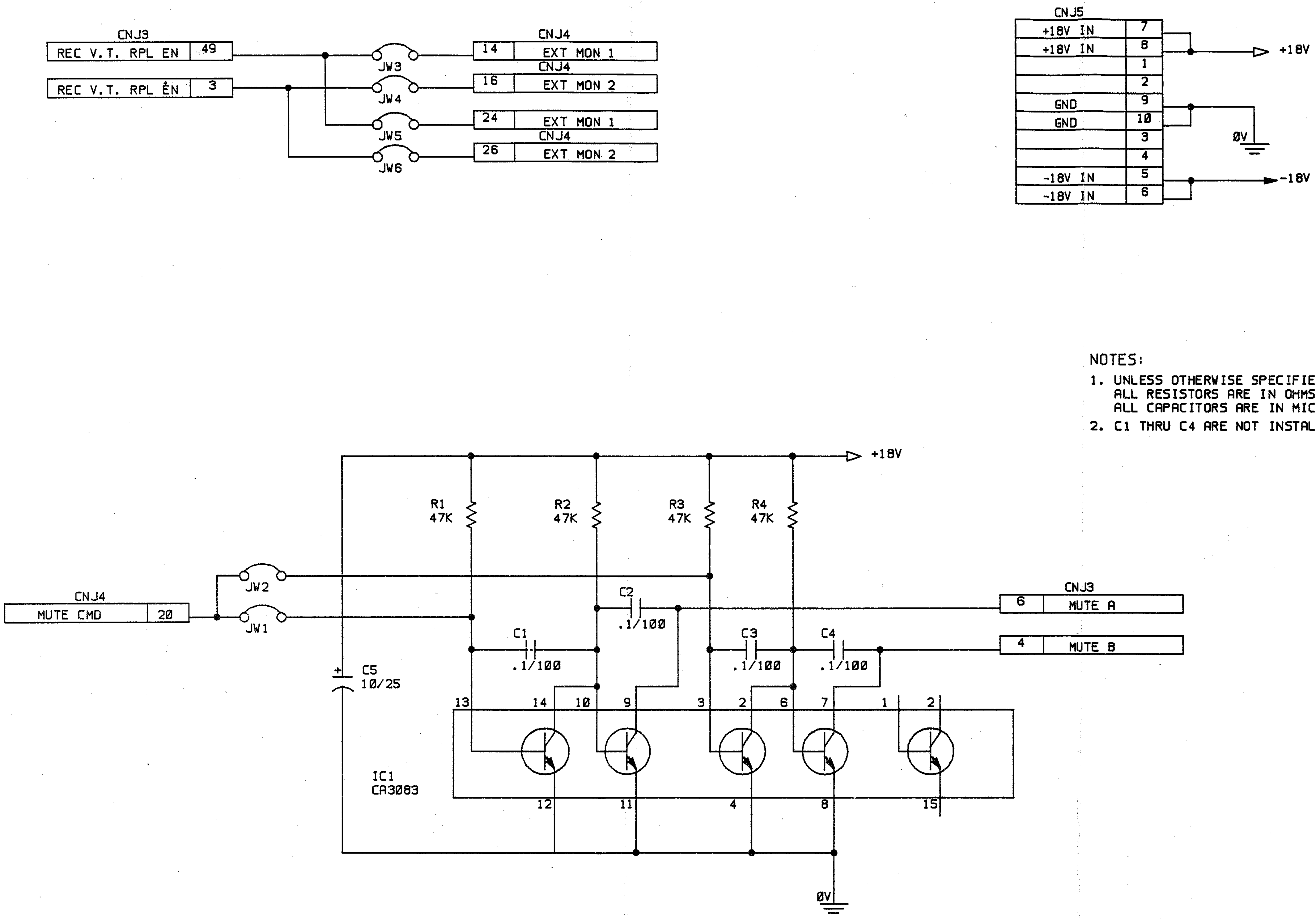

CNJ3
CNJ4
R1
R2
C1
C2
IC1
C3
C4
C5
R3
R4
JW3
JW4
JW1
JW2
JW5
JW6
CNJ5

Figure 6-17. Dummy Editor Board (DEB) Mechanical Assembly


CNJ3
REC V.T. RPL EN
49
REC V.T. RPL ĒN
3
JW3
JW4
JW5
JW6
CNJ4
14
EXT MON 1
CNJ4
16
EXT MON 2
24
EXT MON 1
CNJ4
26
EXT MON 2
CNJ5
+18V IN
7
+18V IN
8
1
2
GND
9
GND
10
3
4
-18V IN
5
-18V IN
6
+18V
0V
-18V
+18V
R1
47K
R2
47K
R3
47K
R4
47K
CNJ4
MUTE CMD
20
JW2
JW1
C2
.1/100
C1
.1/100
C3
.1/100
C4
.1/100
CNJ3
6
MUTE A
4
MUTE B
C5
10/25
13
14
10
9
3
2
6
7
1
2
IC1
CA3083
12
11
4
8
15
0V

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTORS ARE IN OHMS,5%,1/6 W.
   ALL CAPACITORS ARE IN MICROFARADS/VOLTS.
2. C1 THRU C4 ARE NOT INSTALLED

Figure 6-18. Dummy Editor Board (DEB) Schematic

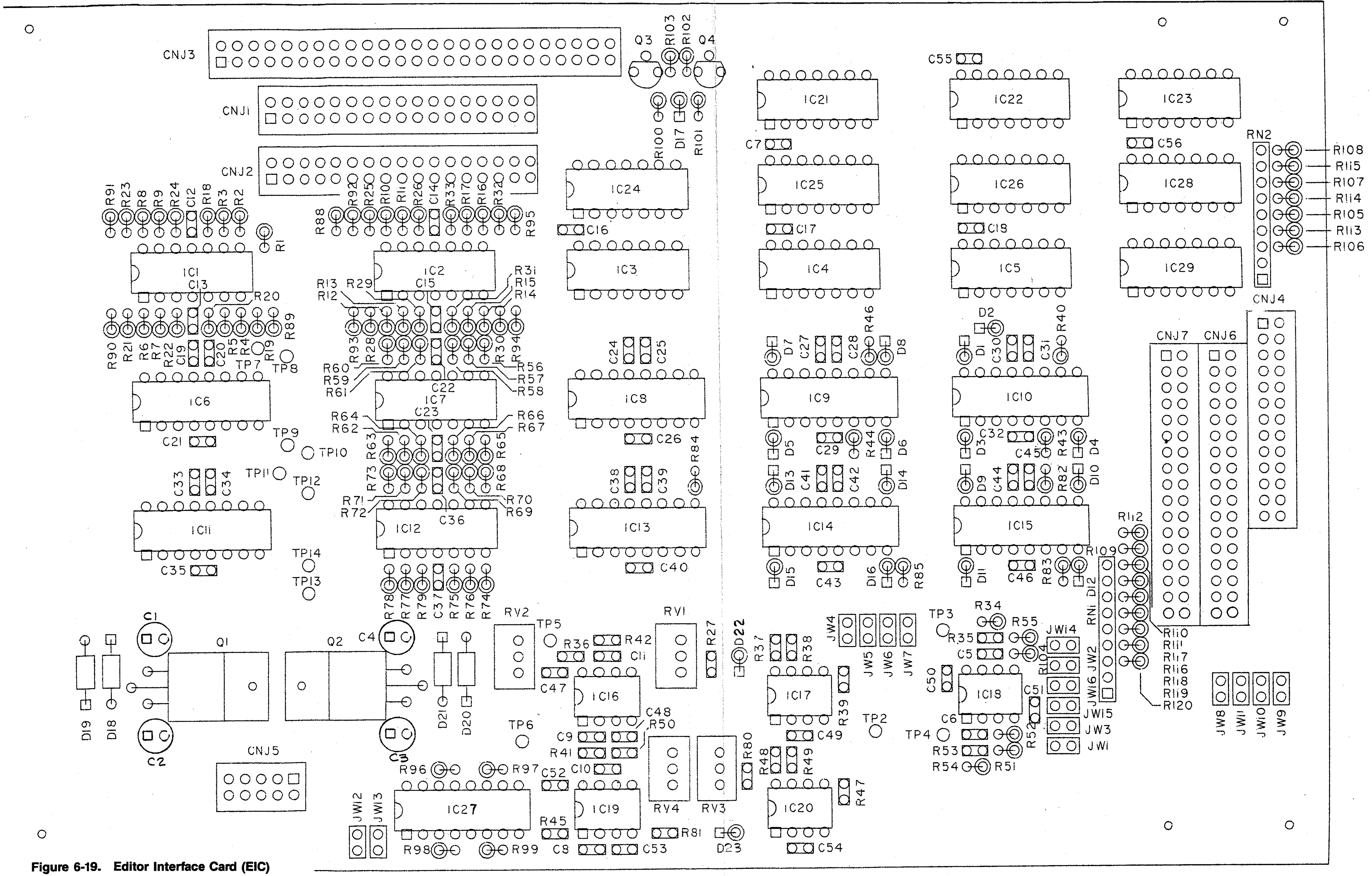
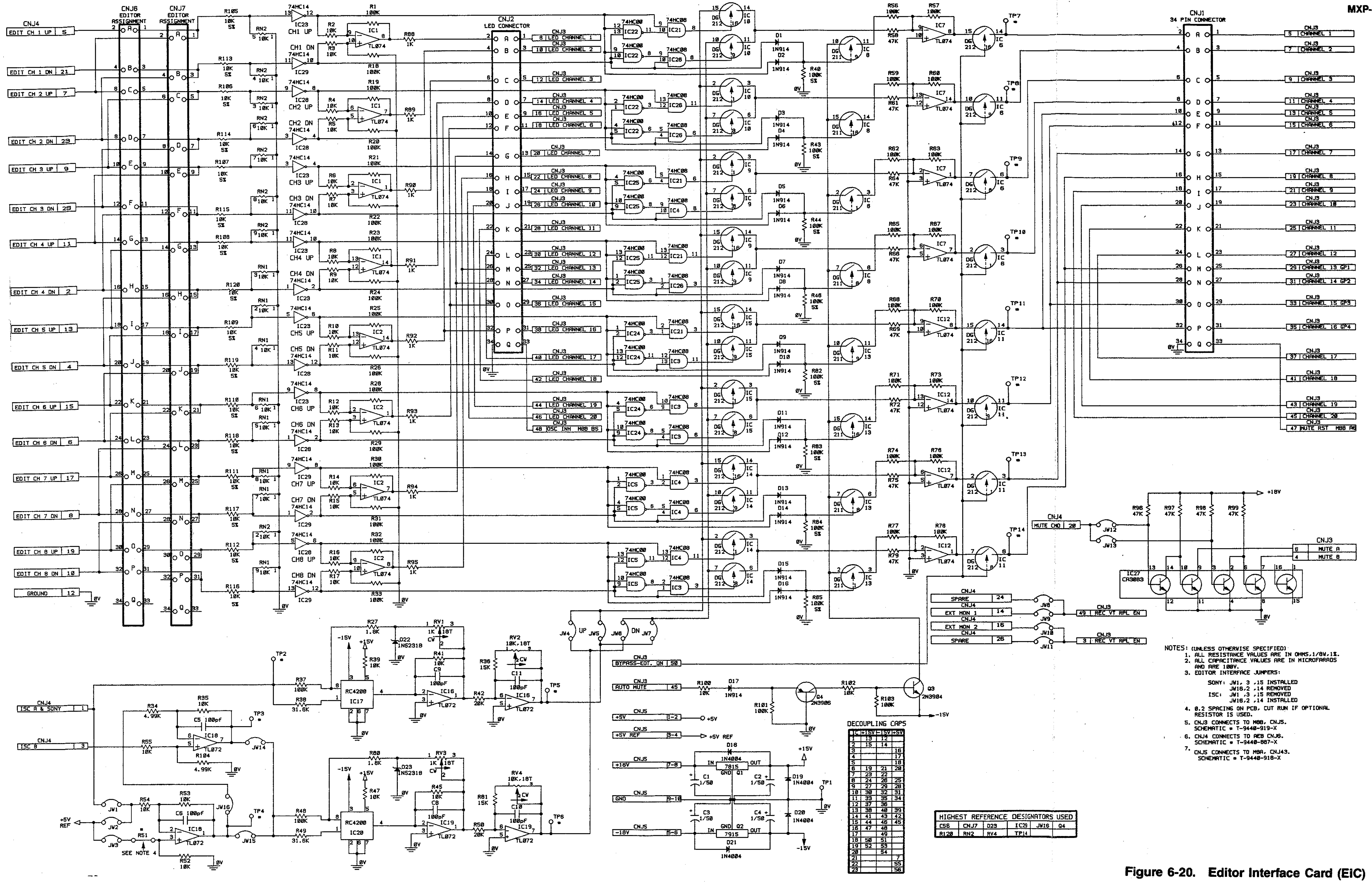

CNJ3
CNJ1
CNJ2
Q3
R103
R102
Q4
R100
D17
R101
C55
IC21
IC22
IC23
C7
C56
RN2
R108
R115
R107
R114
R105
R113
R106
IC24
IC25
IC26
IC28
C16
C17
C18
IC3
IC4
IC5
IC29
CNJ4
R91
R23
R8
R9
R24
C12
R18
R3
R2
R1
R88
R92
R25
R10
R11
R26
C14
R33
R17
R16
R32
R95
IC1
C13
R20
IC2
C15
R13
R29
R12
R31
R15
R14
R90
R21
R6
R7
R22
C19
C20
R5
R4
R19
R89
TP7
TP8
R93
R28
R30
R94
R60
R59
R61
R56
R57
R58
C22
IC7
C23
IC6
R64
R62
R66
R67
R63
R65
C21
TP9
TP10
C33
C34
TP11
TP12
R73
R68
R71
R72
R70
R69
C36
IC11
IC12
C35
TP14
TP13
R78
R77
R79
C37
R75
R76
R74
C24
C25
IC8
C26
R84
C38
C39
IC13
C40
D7
C27
C28
R46
D8
IC9
D5
C29
R44
D6
D13
C41
C42
D14
IC14
D15
C43
D16
R85
D2
R40
D1
C30
C31
IC10
D3
C32
C45
R43
D4
D9
C44
R82
D10
IC15
D11
C46
R83
D12
R109
R112
CNJ7
CNJ6
RN1
R110
R111
R117
R116
R118
R119
R120
C1
Q1
Q2
C4
C2
C3
D19
D18
D21
D20
CNJ5
RV2
TP5
R36
R42
C11
C47
IC16
TP6
C48
R50
C9
R41
C10
RV1
R27
D22
R37
R38
IC17
R39
C49
TP2
JW4
JW5
JW6
JW7
TP3
R34
R35
R55
C5
JW14
R104
C50
IC18
C51
JW2
JW16
JW15
JW3
JW1
C6
TP4
R52
R53
R54
R51
JW8
JW11
JW10
JW9
R96
R97
C52
JW12
JW13
IC27
IC19
RV4
RV3
R80
R48
R49
R47
IC20
R45
R98
R99
C8
C53
R81
D23
C54

Figure 6-19. Editor Interface Card (EIC)
Mechanical Assembly


CNJ4
CNJ6 EDITOR ASSIGNMENT
CNJ7 EDITOR ASSIGNMENT
CNJ2 LED CONNECTOR
CNJ1 34 PIN CONNECTOR
EDIT CH 1 UP 5
EDIT CH 1 DN 21
EDIT CH 2 UP 7
EDIT CH 2 DN 23
EDIT CH 3 UP 9
EDIT CH 3 DN 25
EDIT CH 4 UP 11
EDIT CH 4 DN 2
EDIT CH 5 UP 13
EDIT CH 5 DN 4
EDIT CH 6 UP 15
EDIT CH 6 DN 6
EDIT CH 7 UP 17
EDIT CH 7 DN 8
EDIT CH 8 UP 19
EDIT CH 8 DN 10
GROUND 12
LED CHANNEL 1
LED CHANNEL 2
LED CHANNEL 3
LED CHANNEL 4
LED CHANNEL 5
LED CHANNEL 6
LED CHANNEL 7
LED CHANNEL 8
LED CHANNEL 9
LED CHANNEL 10
LED CHANNEL 11
LED CHANNEL 12
LED CHANNEL 13
LED CHANNEL 14
LED CHANNEL 15
LED CHANNEL 16
LED CHANNEL 17
LED CHANNEL 18
LED CHANNEL 19
LED CHANNEL 20
OSC INH M88 B5
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHANNEL 13 GP1
CHANNEL 14 GP2
CHANNEL 15 GP3
CHANNEL 16 GP4
CHANNEL 17
CHANNEL 18
CHANNEL 19
CHANNEL 20
MUTE RST M88 A6
MUTE CHO 20
MUTE A
MUTE B
IC27 CA3083
SPARE 24
EXT MON 1 14
EXT MON 2 16
SPARE 26
REC VT RPL EN
BYPASS-EDT. ON 50
AUTO MUTE 45
ISC A & SONY 1
ISC B 3
+5V REF
74HC14
74HC08
74HC00
TL074
TL072
RC4200
DG 212
1N914
1N5231B
1N4004
7815
7915
2N3906
2N3904
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
+18V
-18V
+15V
-15V
0V
GND

DECOUPLING CAPS

IC	+15V	-15V	+5V
1	13	12	
2	15	14	
3			16
4			17
5			18
6	19	21	20
7	23	22	
8	24	26	25
9	27	29	28
10	30	32	31
11	33	35	34
12	37	36	
13	38	40	39
14	41	43	42
15	44	46	45
16	47	48	
17		49	
18	50	51	
19	52	53	
20		54	
21			7
22			55
23			56

HIGHEST REFERENCE DESIGNATORS USED					
C56	CNJ7	D23	IC29	JW16	Q4
R120	RN2	RV4	TP14		

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/8W, 1%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS AND ARE 100V.
3. EDITOR INTERFACE JUMPERS:

   SONY: JW1, 3 ,15 INSTALLED
   JW16,2 ,14 REMOVED
   ISC: JW1 ,3 ,15 REMOVED
   JW16,2 ,14 INSTALLED
4. 0.2 SPACING ON PCB, CUT RUN IF OPTIONAL RESISTOR IS USED.
5. CNJ3 CONNECTS TO M88, CNJ5. SCHEMATIC # T-9440-919-X
6. CNJ4 CONNECTS TO AEB CNJ6. SCHEMATIC # T-9440-887-X
7. CNJ5 CONNECTS TO M8A, CNJ43. SCHEMATIC # T-9440-918-X

Figure 6-20. Editor Interface Card (EIC) Schematic

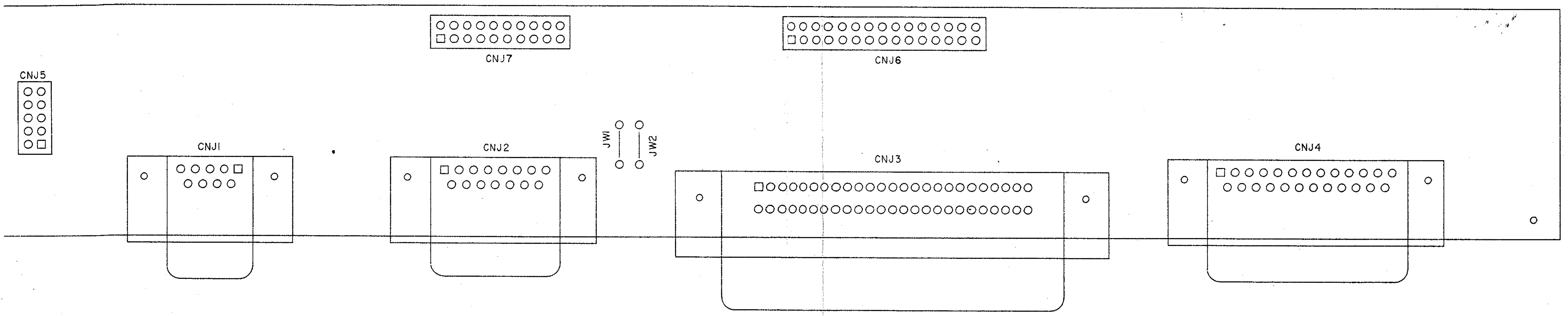

CNJ5
CNJ7
CNJ6
CNJ1
CNJ2
JW1
JW2
CNJ3
CNJ4

Figure 6-21. Automated Editor Board (AEB)
Mechanical Assembly

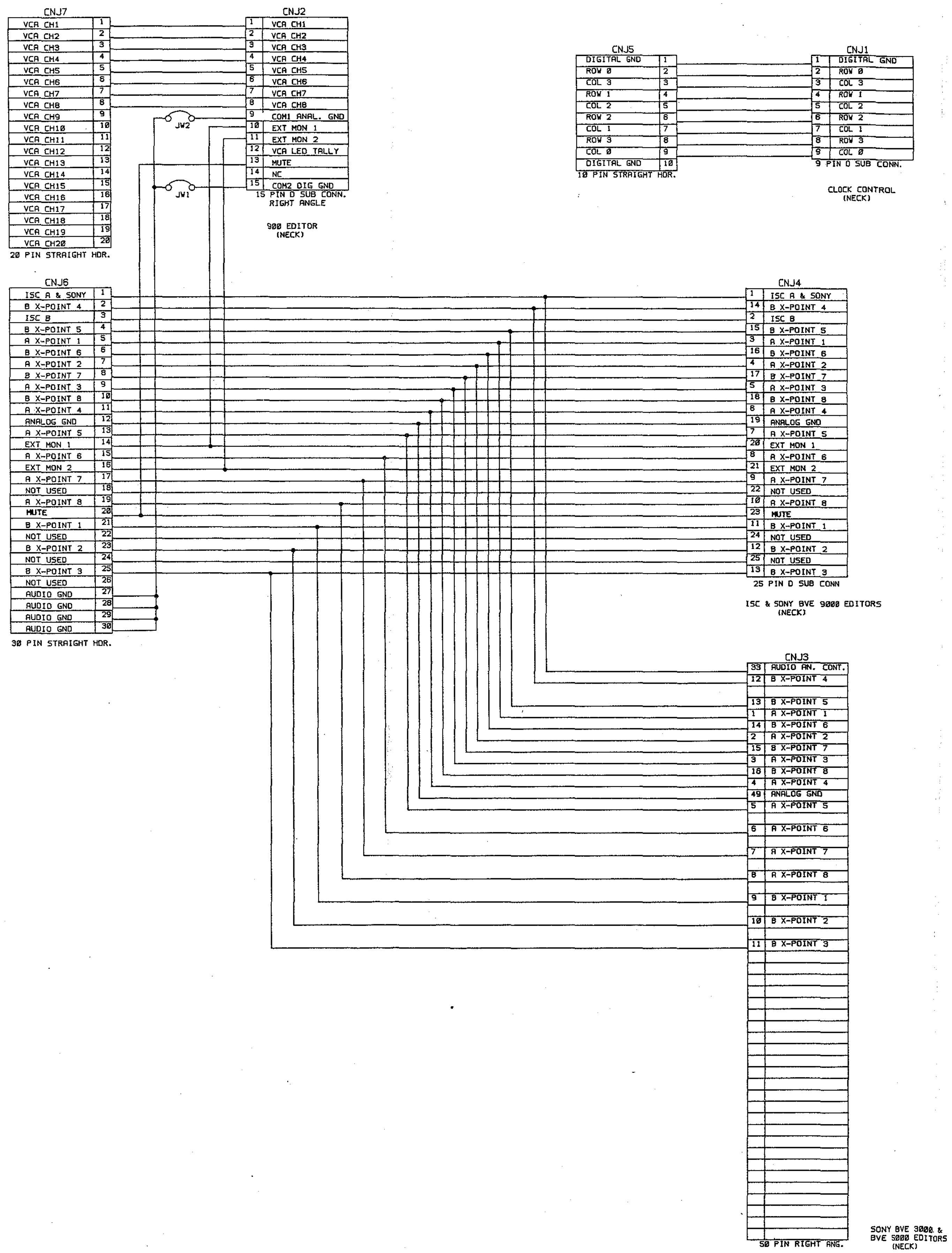

CNJ7
VCA CH1 1
VCA CH2 2
VCA CH3 3
VCA CH4 4
VCA CH5 5
VCA CH6 6
VCA CH7 7
VCA CH8 8
VCA CH9 9
VCA CH10 10
VCA CH11 11
VCA CH12 12
VCA CH13 13
VCA CH14 14
VCA CH15 15
VCA CH16 16
VCA CH17 17
VCA CH18 18
VCA CH19 19
VCA CH20 20
20 PIN STRAIGHT HDR.
JW2
JW1
CNJ2
1 VCA CH1
2 VCA CH2
3 VCA CH3
4 VCA CH4
5 VCA CH5
6 VCA CH6
7 VCA CH7
8 VCA CH8
9 COM1 ANAL. GND
10 EXT MON 1
11 EXT MON 2
12 VCA LED TALLY
13 MUTE
14 NC
15 COM2 DIG GND
15 PIN D SUB CONN.
RIGHT ANGLE
900 EDITOR
(NECK)
CNJ5
DIGITAL GND 1
ROW 0 2
COL 3 3
ROW 1 4
COL 2 5
ROW 2 6
COL 1 7
ROW 3 8
COL 0 9
DIGITAL GND 10
10 PIN STRAIGHT HDR.
CNJ1
1 DIGITAL GND
2 ROW 0
3 COL 3
4 ROW 1
5 COL 2
6 ROW 2
7 COL 1
8 ROW 3
9 COL 0
9 PIN D SUB CONN.
CLOCK CONTROL
(NECK)
CNJ6
ISC A & SONY 1
B X-POINT 4 2
ISC B 3
B X-POINT 5 4
A X-POINT 1 5
B X-POINT 6 6
A X-POINT 2 7
B X-POINT 7 8
A X-POINT 3 9
B X-POINT 8 10
A X-POINT 4 11
ANALOG GND 12
A X-POINT 5 13
EXT MON 1 14
A X-POINT 6 15
EXT MON 2 16
A X-POINT 7 17
NOT USED 18
A X-POINT 8 19
MUTE 20
B X-POINT 1 21
NOT USED 22
B X-POINT 2 23
NOT USED 24
B X-POINT 3 25
NOT USED 26
AUDIO GND 27
AUDIO GND 28
AUDIO GND 29
AUDIO GND 30
30 PIN STRAIGHT HDR.
CNJ4
1 ISC A & SONY
14 B X-POINT 4
2 ISC B
15 B X-POINT 5
3 A X-POINT 1
16 B X-POINT 6
4 A X-POINT 2
17 B X-POINT 7
5 A X-POINT 3
18 B X-POINT 8
6 A X-POINT 4
19 ANALOG GND
7 A X-POINT 5
20 EXT MON 1
8 A X-POINT 6
21 EXT MON 2
9 A X-POINT 7
22 NOT USED
10 A X-POINT 8
23 MUTE
11 B X-POINT 1
24 NOT USED
12 B X-POINT 2
25 NOT USED
13 B X-POINT 3
25 PIN D SUB CONN
ISC & SONY BVE 9000 EDITORS
(NECK)
CNJ3
33 AUDIO AN. CONT.
12 B X-POINT 4
13 B X-POINT 5
1 A X-POINT 1
14 B X-POINT 6
2 A X-POINT 2
15 B X-POINT 7
3 A X-POINT 3
16 B X-POINT 8
4 A X-POINT 4
49 ANALOG GND
5 A X-POINT 5
6 A X-POINT 6
7 A X-POINT 7
8 A X-POINT 8
9 B X-POINT 1
10 B X-POINT 2
11 B X-POINT 3
50 PIN RIGHT ANG.
SONY BVE 3000 &
BVE 5000 EDITORS
(NECK)

Figure 6-22. Automated Editor Board (AEB) Schematic

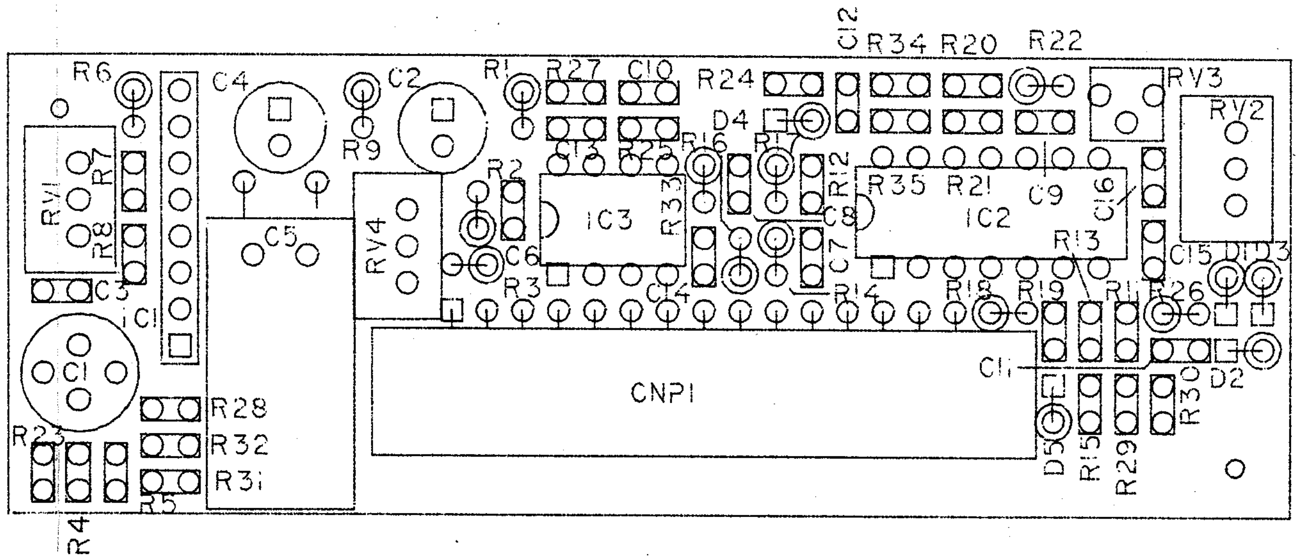
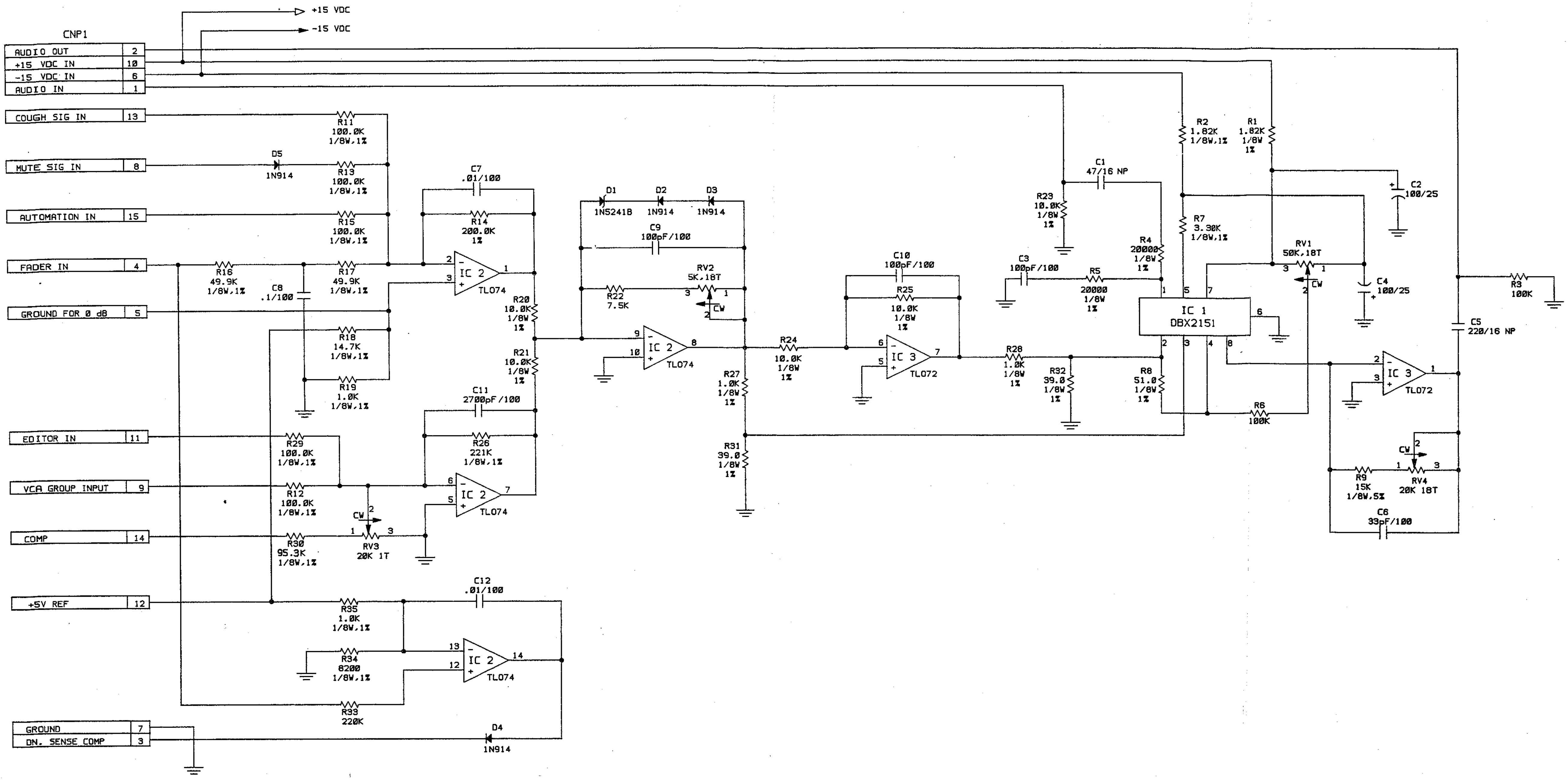

R6
C4
C2
R1
R27
C10
R24
C12
R34
R20
R22
RV3
RV2
RV1
R7
R8
R9
D4
C13
R25
R16
R17
R12
R2
IC3
R33
R35
R21
C9
C16
IC2
C5
RV4
C6
C8
C7
R13
C15
D1
D3
C3
C1
R3
C14
R14
R18
R19
R11
R26
CNP1
C11
D2
R30
R28
R32
R31
R23
R5
D5
R15
R29
R4

Figure 6-23. Voltage Controlled Amplifier (VCA) Mechanical Assembly


CNP1
AUDIO OUT 2
+15 VDC IN 10
-15 VDC IN 6
AUDIO IN 1
COUGH SIG IN 13
MUTE SIG IN 8
AUTOMATION IN 15
FADER IN 4
GROUND FOR 0 dB 5
EDITOR IN 11
VCA GROUP INPUT 9
COMP 14
+5V REF 12
GROUND 7
ON. SENSE COMP 3
+15 VDC
-15 VDC
R11 100.0K 1/8W,1%
D5 1N914
R13 100.0K 1/8W,1%
R15 100.0K 1/8W,1%
R16 49.9K 1/8W,1%
C8 .1/100
R17 49.9K 1/8W,1%
R18 14.7K 1/8W,1%
R19 1.0K 1/8W,1%
C7 .01/100
R14 200.0K 1%
IC 2 TL074
R20 10.0K 1/8W 1%
R21 10.0K 1/8W 1%
C11 2700pF/100
R26 221K 1/8W,1%
R29 100.0K 1/8W,1%
R12 100.0K 1/8W,1%
R30 95.3K 1/8W,1%
RV3 20K 1T
CW
C12 .01/100
R35 1.0K 1/8W,1%
R34 8200 1/8W,1%
R33 220K
D4 1N914
D1 1N5241B
D2 1N914
D3 1N914
C9 100pF/100
R22 7.5K
RV2 5K,18T
R27 1.0K 1/8W 1%
R31 39.0 1/8W 1%
R24 10.0K 1/8W 1%
C10 100pF/100
R25 10.0K 1/8W 1%
IC 3 TL072
R28 1.0K 1/8W 1%
R32 39.0 1/8W 1%
C3 100pF/100
R5 20000 1/8W 1%
R23 10.0K 1/8W 1%
C1 47/16 NP
R4 20000 1/8W 1%
R2 1.82K 1/8W,1%
R1 1.82K 1/8W 1%
R7 3.30K 1/8W,1%
C2 100/25
RV1 50K,18T
C4 100/25
IC 1 DBX2151
R8 51.0 1/8W 1%
R6 100K
C5 220/16 NP
R3 100K
R9 15K 1/8W,5%
RV4 20K 18T
C6 33pF/100

HIGHEST REFERENCE DESIGNATORS USED					
C16	CNP1	D5	IC3		R35
RV4					

REFERENCE DESIGNATORS NOT USED					
R10					

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.

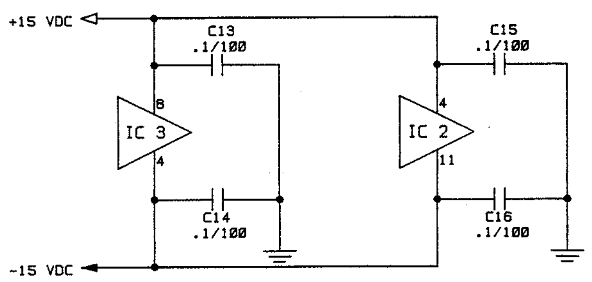

+15 VDC
-15 VDC
C13 .1/100
C14 .1/100
IC 3
C15 .1/100
C16 .1/100
IC 2

Figure 6-24. Voltage Controlled Amplifier (VCA) Schematic

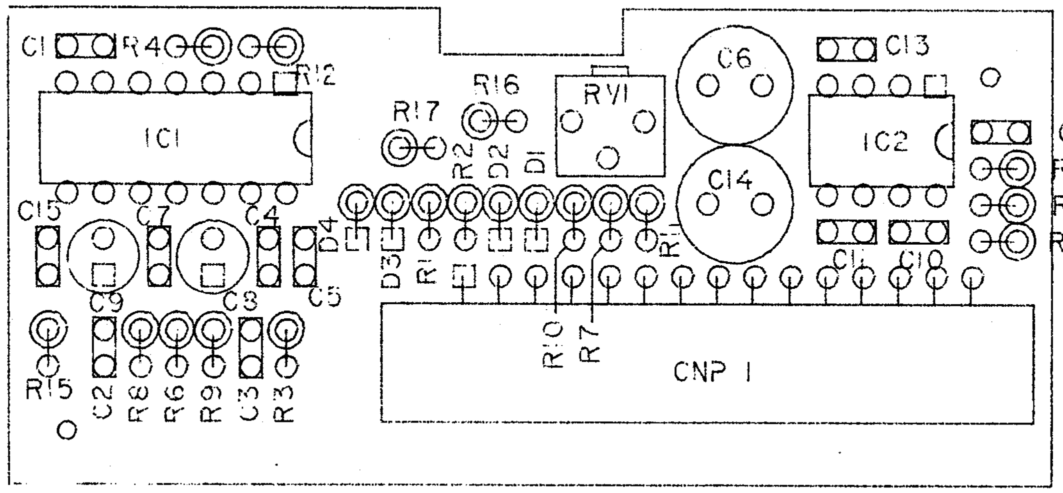
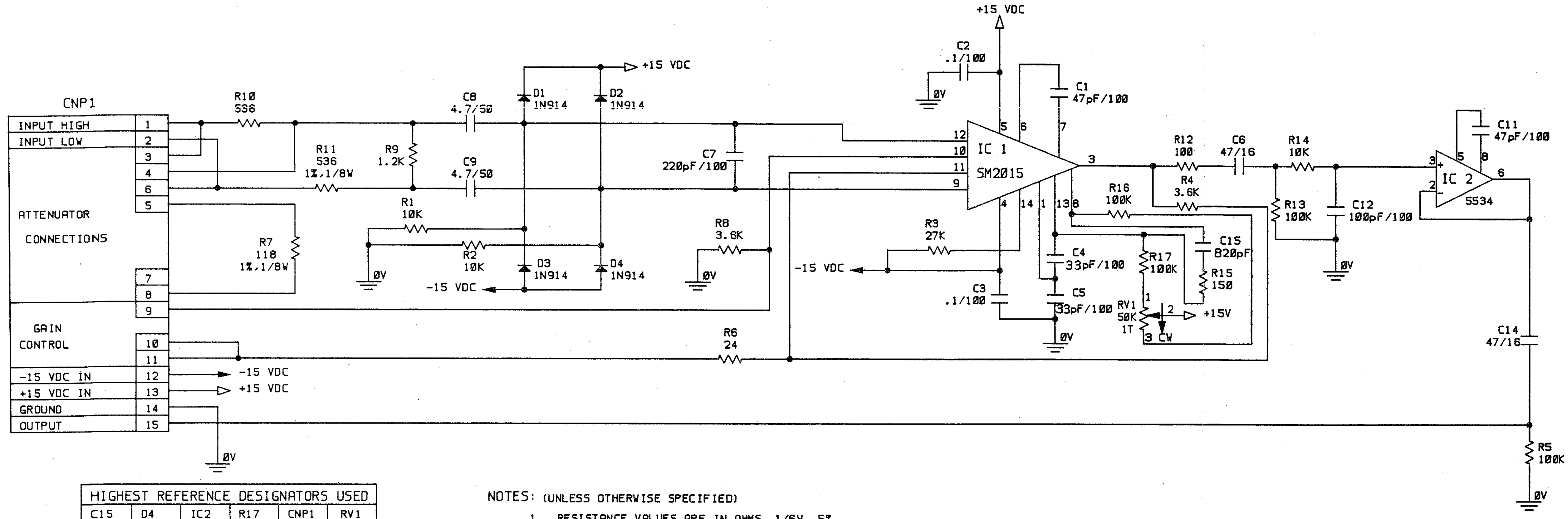

C1
R4
R12
IC1
R17
R16
R2
D2
D1
RV1
C6
C13
IC2
C12
R14
R13
R5
C14
C15
C7
C4
D4
D3
R1
R11
C11
C10
C9
C8
C5
R15
C2
R8
R6
R9
C3
R3
R10
R7
CNP 1

Figure 6-25. Electronic Microphone Amplifier (EMA) Mechanical Assembly


CNP1
INPUT HIGH 1
INPUT LOW 2
3
4
6
5
ATTENUATOR CONNECTIONS
7
8
9
GAIN CONTROL
10
11
-15 VDC IN 12
+15 VDC IN 13
GROUND 14
OUTPUT 15
-15 VDC
+15 VDC
0V
R10 536
R11 536 1%,1/8W
R9 1.2K
R7 118 1%,1/8W
C8 4.7/50
C9 4.7/50
R1 10K
R2 10K
0V
-15 VDC
D1 1N914
D2 1N914
D3 1N914
D4 1N914
+15 VDC
C7 220pF/100
R8 3.6K
0V
R6 24
+15 VDC
C2 .1/100
0V
C1 47pF/100
IC 1 SM2015
12
10
11
9
5
6
7
3
4
14
1
13
8
R3 27K
-15 VDC
C3 .1/100
C4 33pF/100
C5 33pF/100
0V
R16 100K
R12 100
R4 3.6K
C6 47/16
R14 10K
R13 100K
C12 100pF/100
0V
C15 820pF
R17 100K
R15 150
RV1 50K 1T
1
2
3 CW
+15V
C11 47pF/100
IC 2 5534
3 +
2 -
5
8
6
C14 47/16
R5 100K
0V

HIGHEST REFERENCE DESIGNATORS USED					
C15	D4	IC2	R17	CNP1	RV1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.

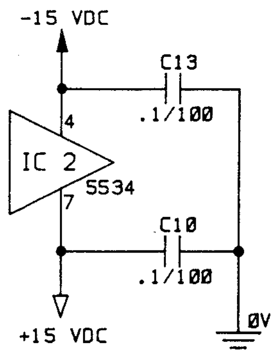

-15 VDC
C13
.1/100
4
IC 2
5534
7
C10
.1/100
+15 VDC
0V

Figure 6-26. Electronic Microphone Amplifier (EMA) Schematic

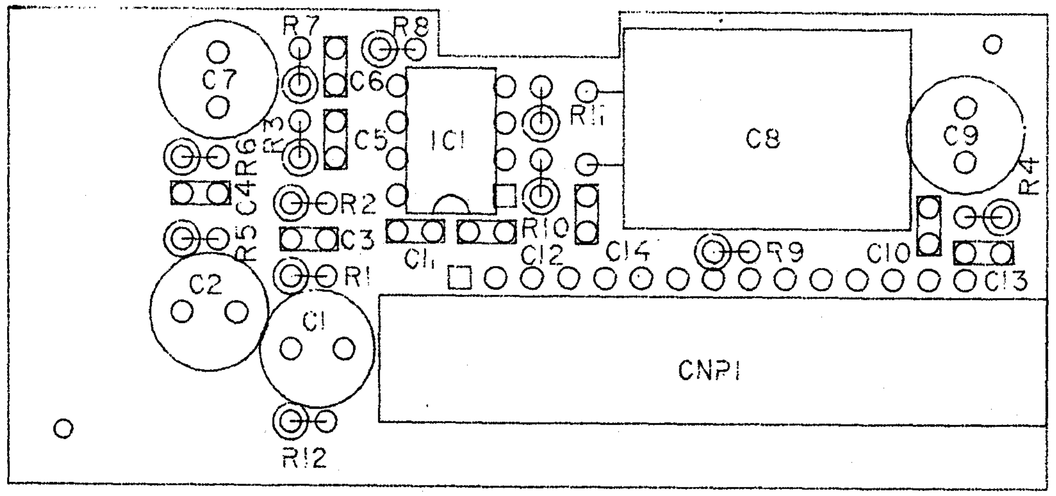
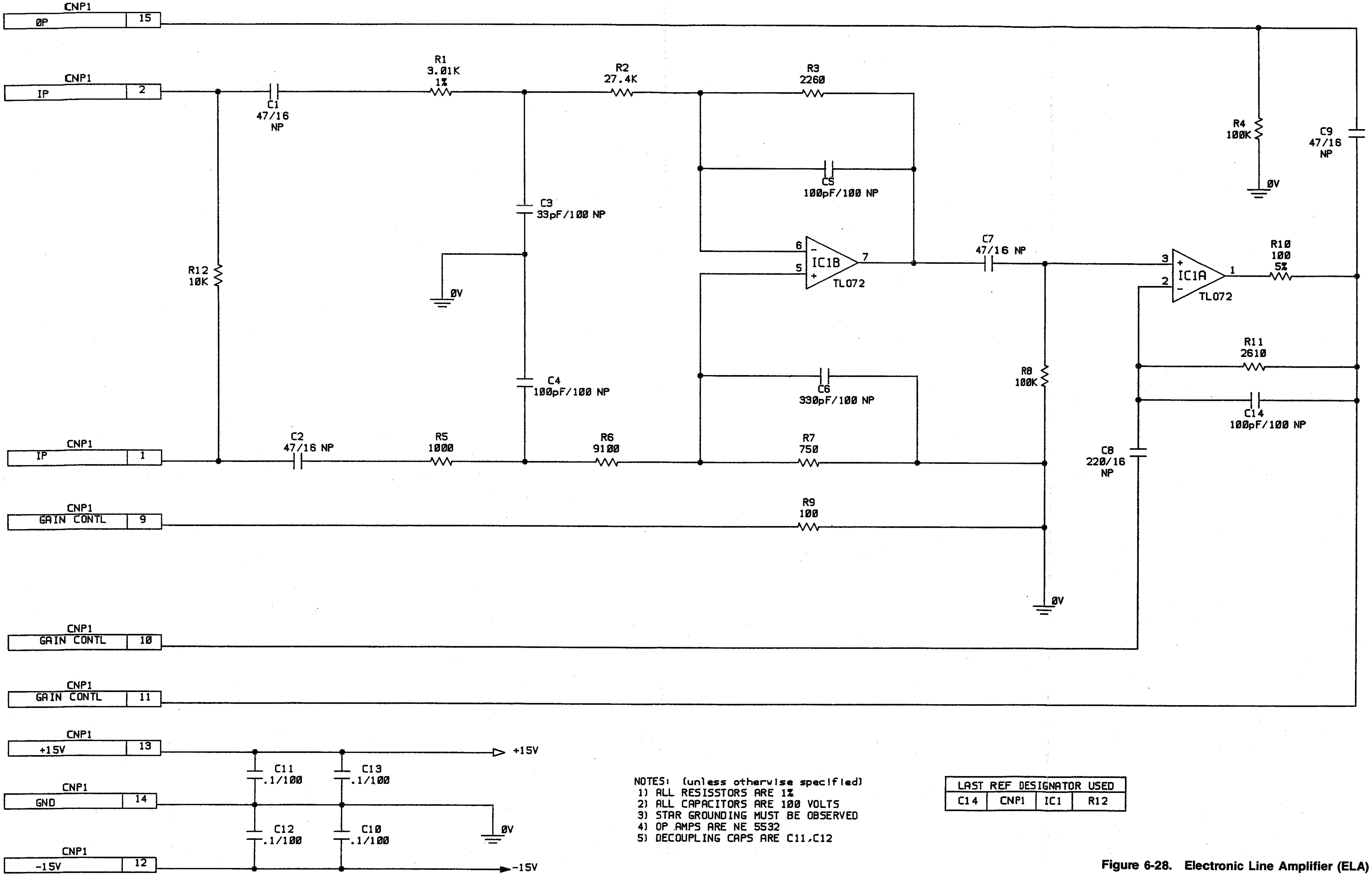

R7
R8
C7
C6
R3
R6
C5
IC1
R11
C8
C9
R4
C4
R5
R2
C3
R1
C11
C12
R10
C14
R9
C10
C13
C2
C1
CNP1
R12

**Figure 6-27. Electronic Line Amplifier (ELA)
Mechanical Assembly**


CNP1
0P
15
CNP1
IP
2
C1
47/16
NP
R1
3.01K
1%
R2
27.4K
R3
2260
C5
100pF/100 NP
R4
100K
0V
C9
47/16
NP
C3
33pF/100 NP
0V
R12
10K
6
5
IC1B
7
TL072
C7
47/16 NP
3
2
IC1A
1
TL072
R10
100
5%
R11
2610
C4
100pF/100 NP
C6
330pF/100 NP
R8
100K
C14
100pF/100 NP
C8
220/16
NP
CNP1
IP
1
C2
47/16 NP
R5
1000
R6
9100
R7
750
CNP1
GAIN CONTL
9
R9
100
0V
CNP1
GAIN CONTL
10
CNP1
GAIN CONTL
11
CNP1
+15V
13
+15V
C11
.1/100
C13
.1/100
CNP1
GND
14
C12
.1/100
C10
.1/100
0V
CNP1
-15V
12
-15V

NOTES: (unless otherwise specified)
1) ALL RESISSTORS ARE 1%
2) ALL CAPACITORS ARE 100 VOLTS
3) STAR GROUNDING MUST BE OBSERVED
4) OP AMPS ARE NE 5532
5) DECOUPLING CAPS ARE C11,C12

LAST REF DESIGNATOR USED			
C14	CNP1	IC1	R12

Figure 6-28. Electronic Line Amplifier (ELA) Schematic

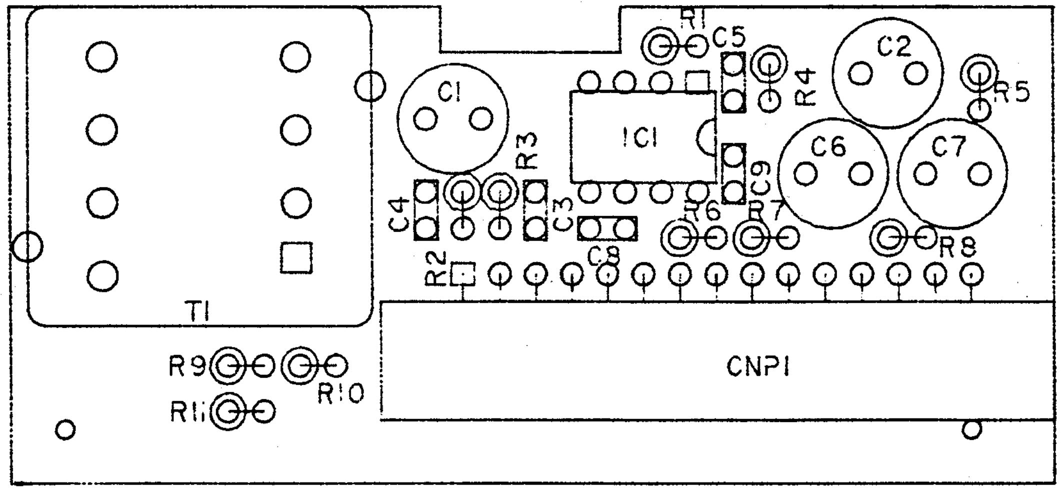
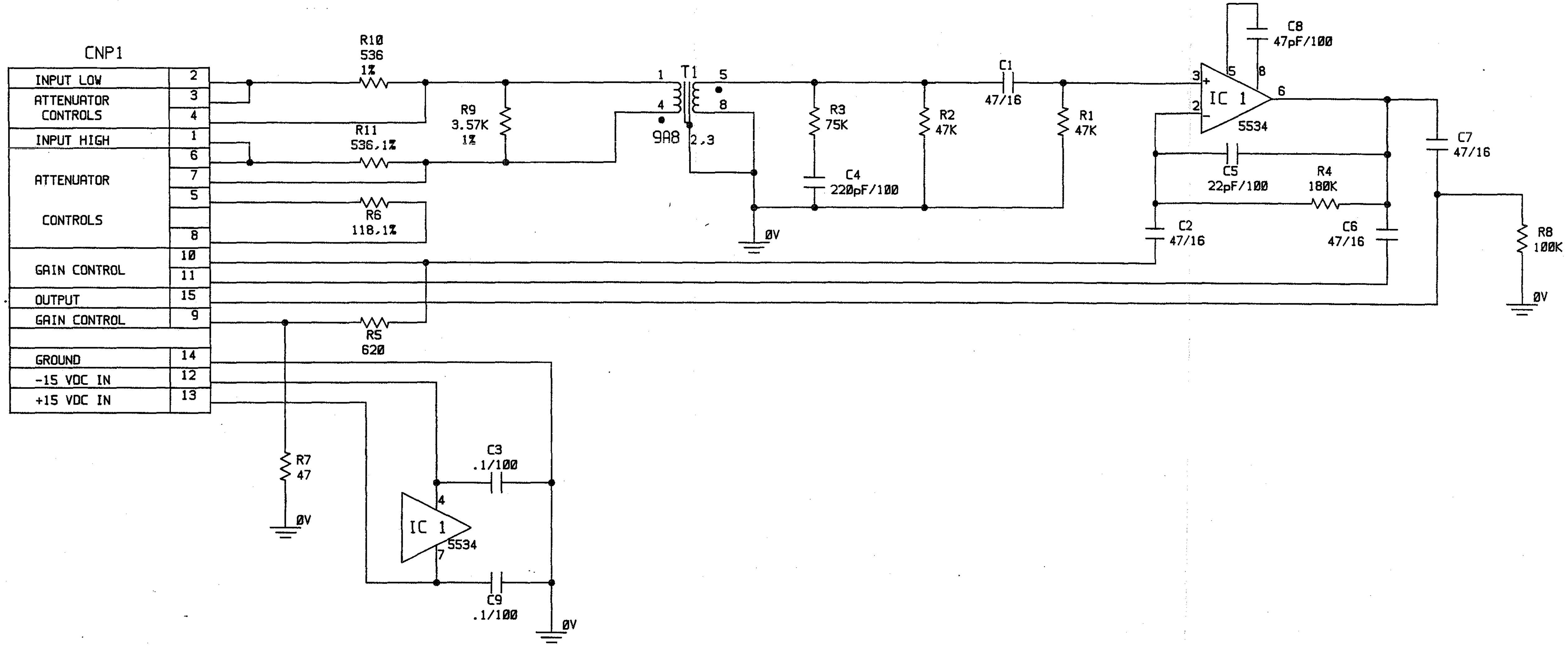

T1
C1
IC1
R1
C5
R4
C2
R5
C6
C7
R3
C4
C3
C9
R6
R7
C8
R8
R2
CNP1
R9
R10
R11

Figure 6-29. Transformer Microphone Amplifier (TMA) Mechanical Assembly


CNP1
INPUT LOW
ATTENUATOR CONTROLS
INPUT HIGH
ATTENUATOR
CONTROLS
GAIN CONTROL
OUTPUT
GAIN CONTROL
GROUND
-15 VDC IN
+15 VDC IN
2
3
4
1
6
7
5
8
10
11
15
9
14
12
13
R10
536
1%
R11
536,1%
R6
118,1%
R9
3.57K
1%
R5
620
R7
47
0V
T1
1
4
5
8
9A8
2,3
R3
75K
C4
220pF/100
0V
R2
47K
C1
47/16
R1
47K
C8
47pF/100
IC 1
5534
3
2
5
8
6
C5
22pF/100
R4
180K
C2
47/16
C6
47/16
C7
47/16
R8
100K
0V
C3
.1/100
IC 1
5534
4
7
C9
.1/100
0V

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
3. NOT SHOWN, PINS 6 & 7 OF T1 ALSO CONNECT TO GROUND.

HIGHEST REFERENCE DESIGNATORS USED					
C9	CNP1	IC1	R11	T1	

Figure 6-30. Transformer Microphone Amplifier (TMA) Schematic

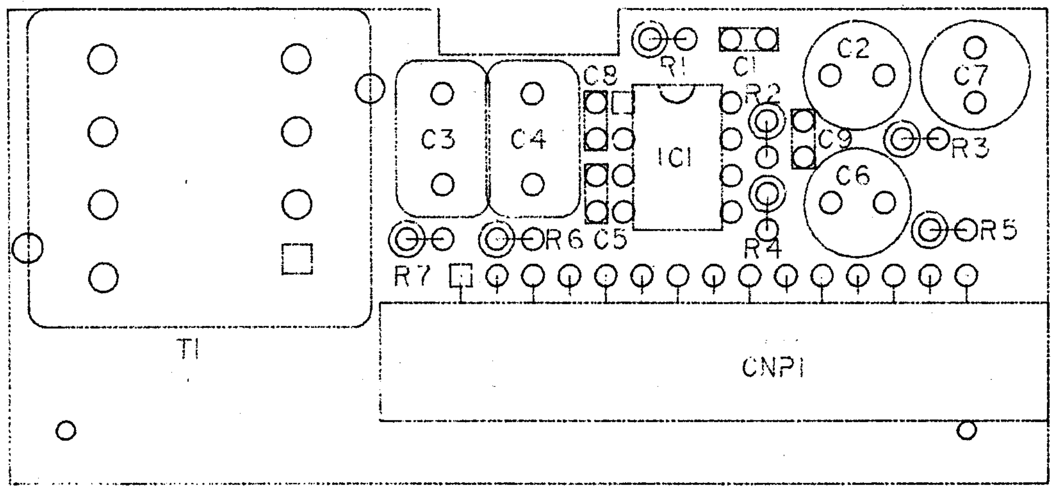
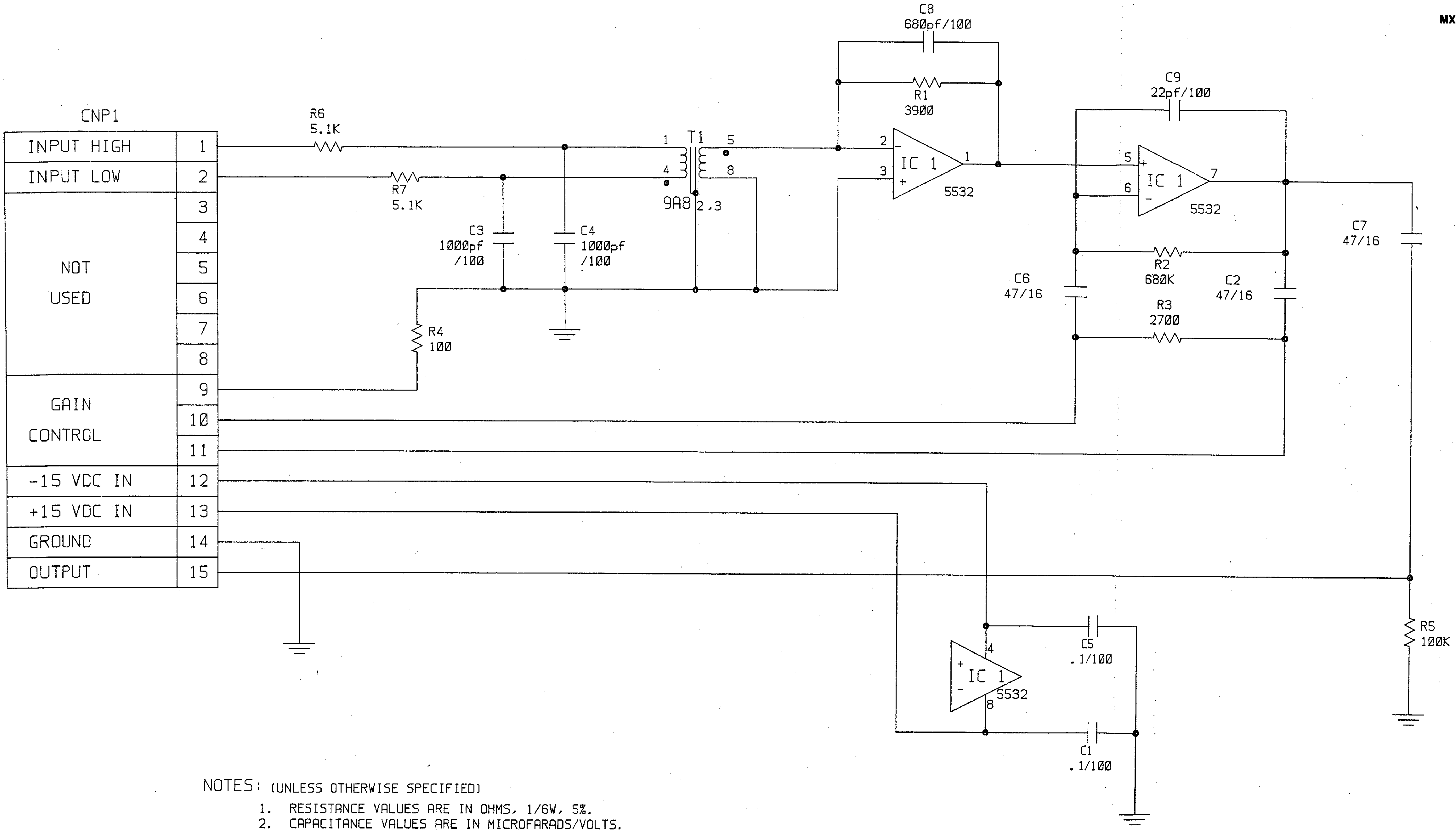

T1
C3
C4
C8
R1
C1
C2
C7
R2
IC1
C9
R3
C6
R5
R6
C5
R4
R7
CNP1

Figure 6-31. Transformer Line Amplifier (TLA)
Mechanical Assembly


CNP1
INPUT HIGH
INPUT LOW
NOT USED
GAIN CONTROL
-15 VDC IN
+15 VDC IN
GROUND
OUTPUT
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
R6
5.1K
R7
5.1K
C3
1000pf
/100
C4
1000pf
/100
R4
100
T1
1
4
5
8
9A8
2,3
C8
680pf/100
R1
3900
IC 1
5532
C9
22pf/100
R2
680K
R3
2700
C6
47/16
C2
47/16
C7
47/16
R5
100K
C5
.1/100
C1
.1/100

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
3. NOT SHOWN, PINS 6 & 7 OF T1 ARE ALSO GROUNDED.

HIGHEST REFERENCE DESIGNATORS USED					
C9	CNP1	IC1	R7	T1	

Figure 6-32. Transformer Line Amplifier (TLA) Schematic

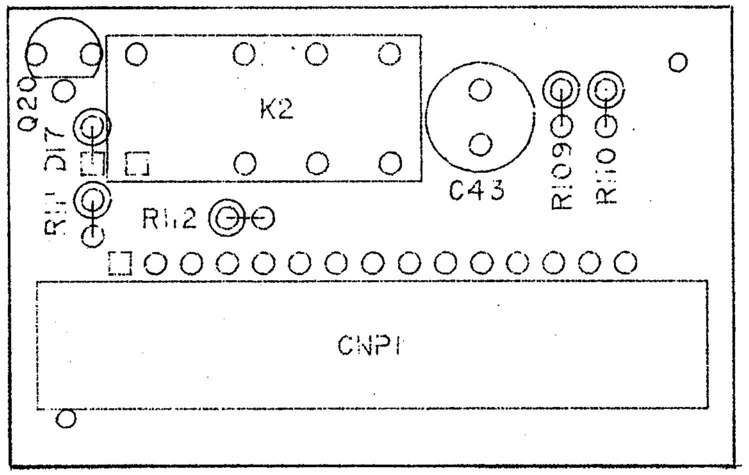

Q20
D17
R111
K2
R112
C43
R109
R110
CNP1

Figure 6-33. Relay Card (RLC) Mechanical Assembly

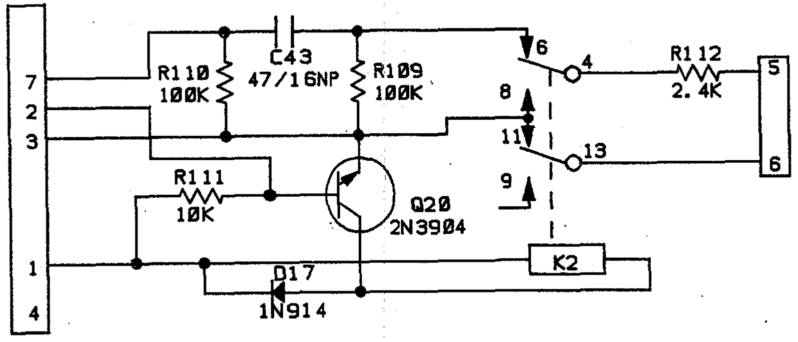

7
2
3
1
4
R110
100K
C43
47/16NP
R109
100K
6
4
8
11
13
9
R112
2.4K
5
6
R111
10K
Q20
2N3904
D17
1N914
K2

Figure 6-34. Relay Card (RLC) Schematic

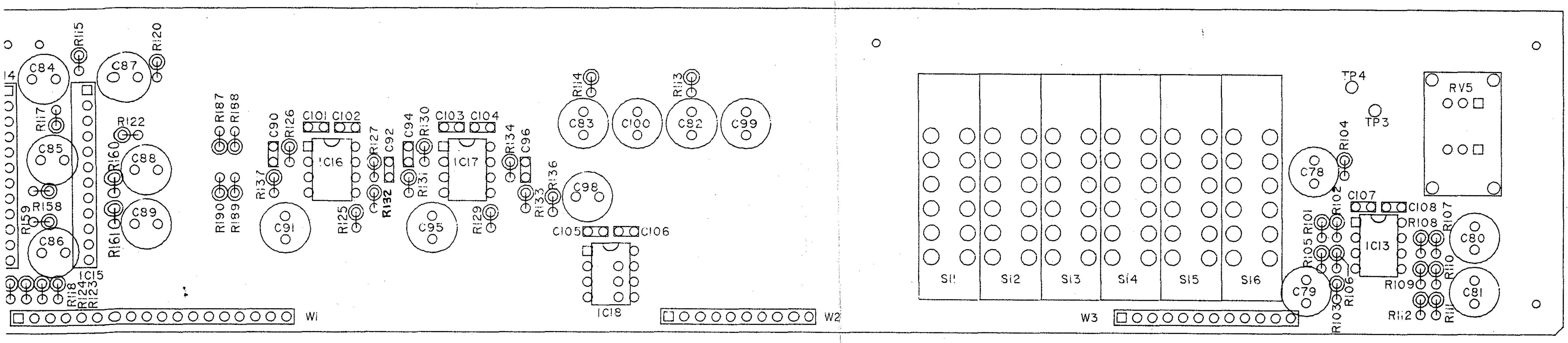
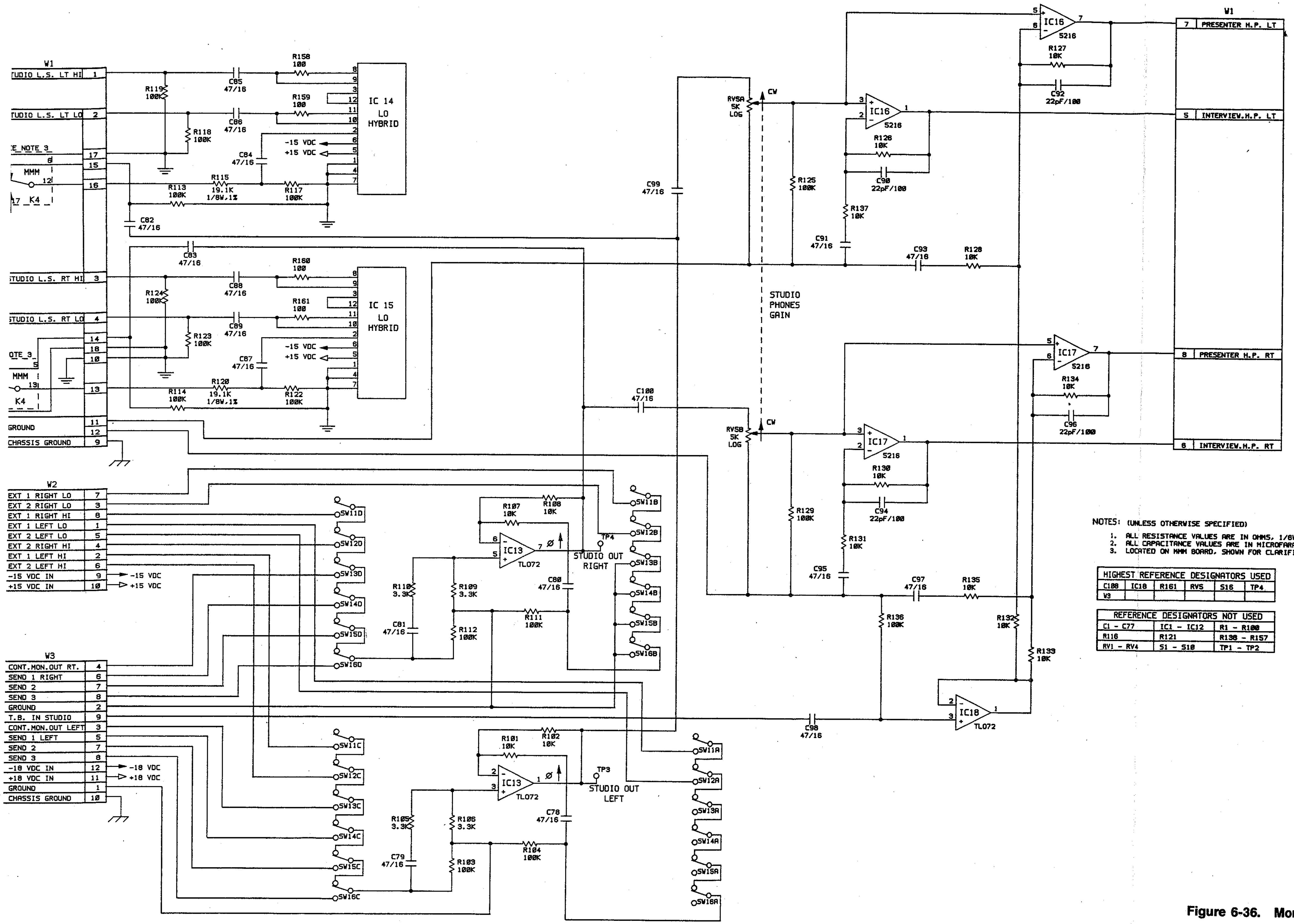

C84
C85
C86
C87
C88
C89
R115
R117
R120
R122
R158
R159
R160
R161
R118
R124
R123
IC15
R187
R188
R190
R189
C90
R126
R137
C91
C101
C102
IC16
R125
R127
C92
R132
C94
R130
R131
C95
C103
C104
IC17
R129
R134
C96
R136
R133
C105
C106
IC18
C98
R114
C83
C100
R113
C82
C99
W1
W2
W3
S11
S12
S13
S14
S15
S16
TP4
TP3
RV5
R104
C78
C107
C108
R102
R101
R105
R108
R107
IC13
C80
R103
R106
C79
R110
R109
C81
R112
R111

Figure 6-35. Monitor Module Sub-board (MMS) Mechanical Assembly


W1
TUDIO L.S. LT HI 1
TUDIO L.S. LT LO 2
E NOTE 3
17
6
15
MMM
12
16
17 K4
STUDIO L.S. RT HI 3
STUDIO L.S. RT LO 4
14
18
10
OTE 3
5
MMM
13
K4
GROUND 11
12
CHASSIS GROUND 9
R119 100K
R118 100K
C85 47/16
C86 47/16
R158 100
R159 100
C84 47/16
R113 100K
R115 19.1K 1/8W,1%
R117 100K
C82 47/16
IC 14 LO HYBRID
-15 VDC
+15 VDC
C83 47/16
R124 100K
R123 100K
C88 47/16
C89 47/16
R160 100
R161 100
C87 47/16
R114 100K
R120 19.1K 1/8W,1%
R122 100K
IC 15 LO HYBRID
-15 VDC
+15 VDC
C99 47/16
RV5A 5K LOG
CW
R125 100K
IC16 5216
R126 10K
C90 22pF/100
R137 10K
C91 47/16
C93 47/16
R128 10K
IC16 5216
R127 10K
C92 22pF/100
STUDIO PHONES GAIN
C100 47/16
RV5B 5K LOG
CW
R129 100K
IC17 5216
R130 10K
C94 22pF/100
R131 10K
C95 47/16
C97 47/16
R135 10K
R136 100K
IC17 5216
R134 10K
C96 22pF/100
R132 10K
R133 10K
IC18 TL072
C98 47/16
W1
7 PRESENTER H.P. LT
5 INTERVIEW.H.P. LT
8 PRESENTER H.P. RT
6 INTERVIEW.H.P. RT
W2
EXT 1 RIGHT LO 7
EXT 2 RIGHT LO 3
EXT 1 RIGHT HI 8
EXT 1 LEFT LO 1
EXT 2 LEFT LO 5
EXT 2 RIGHT HI 4
EXT 1 LEFT HI 2
EXT 2 LEFT HI 6
-15 VDC IN 9
+15 VDC IN 10
-15 VDC
+15 VDC
W3
CONT.MON.OUT RT. 4
SEND 1 RIGHT 6
SEND 2 7
SEND 3 8
GROUND 2
T.B. IN STUDIO 9
CONT.MON.OUT LEFT 3
SEND 1 LEFT 5
SEND 2 7
SEND 3 8
-18 VDC IN 12
+18 VDC IN 11
GROUND 1
CHASSIS GROUND 10
-18 VDC
+18 VDC
SW11D
SW12D
SW13D
SW14D
SW15D
SW16D
R107 10K
R108 10K
IC13 TL072
Ø
TP4
STUDIO OUT RIGHT
R110 3.3K
R109 3.3K
C81 47/16
R112 100K
R111 100K
C80 47/16
SW11B
SW12B
SW13B
SW14B
SW15B
SW16B
SW11C
SW12C
SW13C
SW14C
SW15C
SW16C
R101 10K
R102 10K
IC13 TL072
Ø
TP3
STUDIO OUT LEFT
R105 3.3K
R106 3.3K
C79 47/16
R103 100K
R104 100K
C78 47/16
SW11A
SW12A
SW13A
SW14A
SW15A
SW16A

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
3. LOCATED ON MMM BOARD, SHOWN FOR CLARIFICATION ONLY.

HIGHEST REFERENCE DESIGNATORS USED					
C108	IC18	R161	RV5	S16	TP4
W3					

REFERENCE DESIGNATORS NOT USED		
C1 - C77	IC1 - IC12	R1 - R100
R116	R121	R138 - R157
RV1 - RV4	S1 - S10	TP1 - TP2

DECOUPLING CAPACITORS				
IC	13	16	17	18
+	C108	C102	C104	C106
-	C107	C101	C103	C105

Figure 6-36. Monitor Module Sub-board (MMS) Schematic

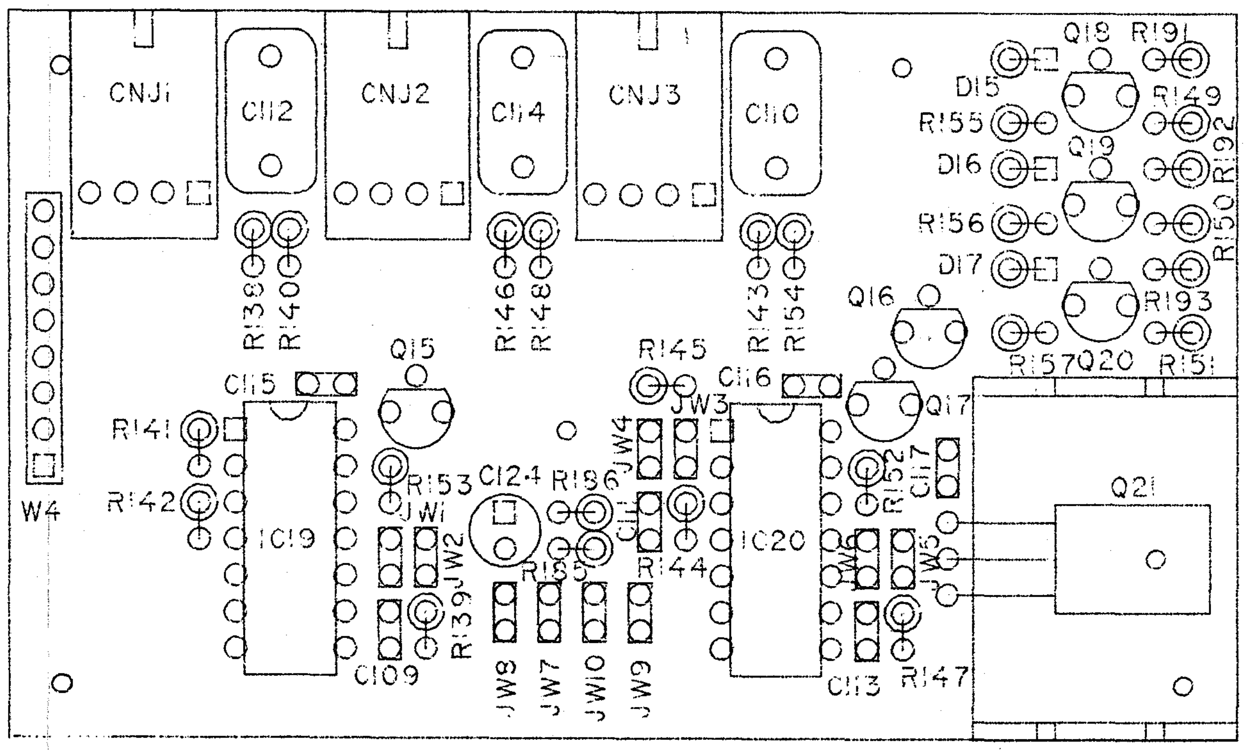
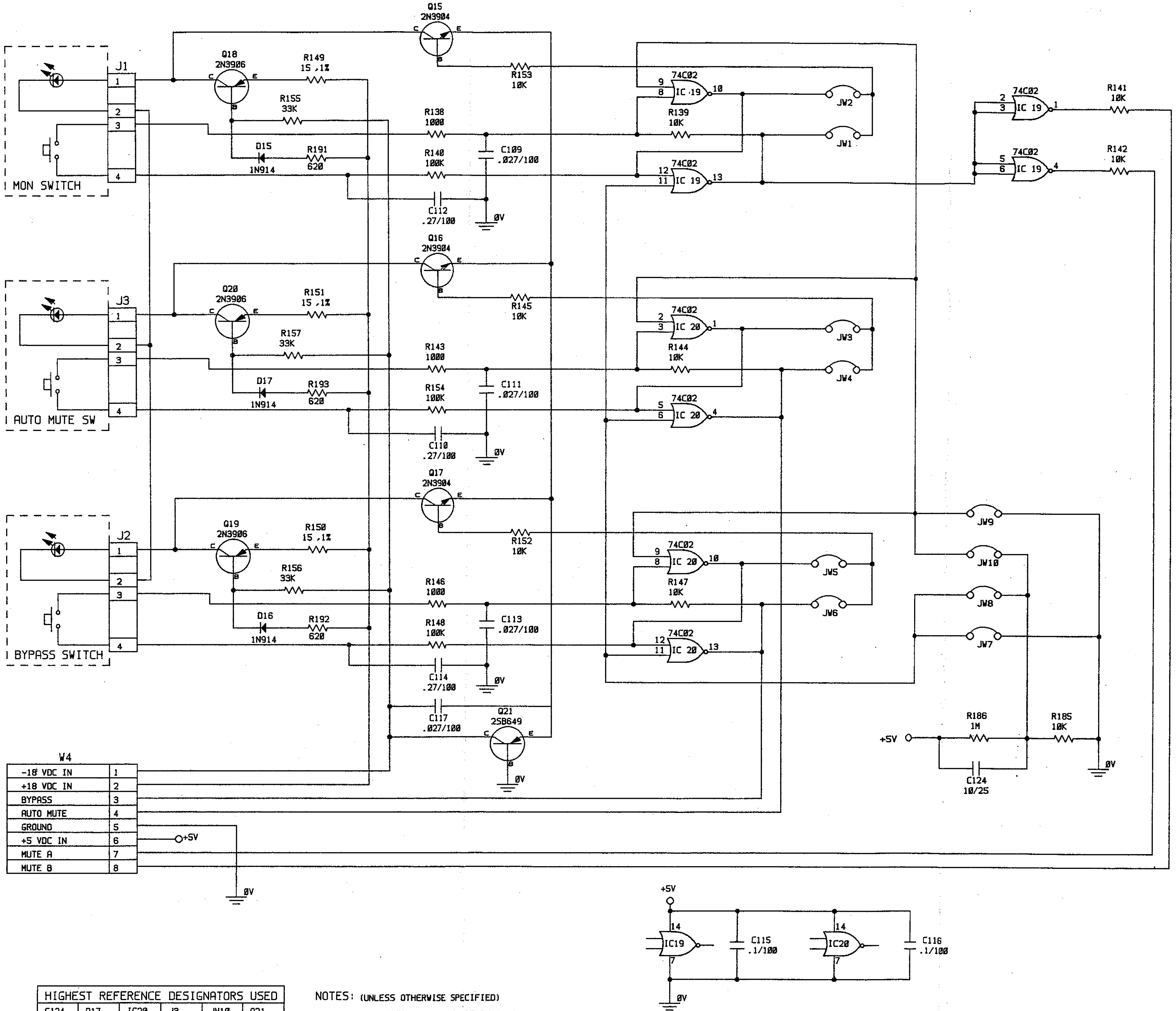

CNJ1
C112
CNJ2
C114
CNJ3
C110
Q18
R191
D15
R149
R155
Q19
D16
R192
R156
R150
D17
R193
Q16
R157
Q20
R151
W4
R138
R140
R146
R148
R143
R154
Q15
R145
C115
C116
JW3
Q17
R141
JW4
C117
R153
C124
R186
R152
Q21
R142
JW1
C111
IC19
JW2
IC20
R185
R144
JW6
JW5
R139
C109
JW8
JW7
JW10
JW9
C113
R147

Figure 6-37. Monitor Module Logic Board (MML) Mechanical Assembly


Q15
2N3904
Q18
2N3906
R149
15 ,1%
R155
33K
D15
1N914
R191
620
R153
10K
R138
1000
R140
100K
C109
.027/100
C112
.27/100
0V
J1
MON SWITCH
Q16
2N3904
Q20
2N3906
R151
15 ,1%
R157
33K
D17
1N914
R193
620
R145
10K
R143
1000
R154
100K
C111
.027/100
C110
.27/100
J3
AUTO MUTE SW
Q17
2N3904
Q19
2N3906
R150
15 ,1%
R156
33K
D16
1N914
R192
620
R152
10K
R146
1000
R148
100K
C113
.027/100
C114
.27/100
J2
BYPASS SWITCH
C117
.027/100
Q21
2SB649
74C02
IC 19
IC 20
R139
10K
R144
10K
R147
10K
JW1
JW2
JW3
JW4
JW5
JW6
JW7
JW8
JW9
JW10
R141
10K
R142
10K
R186
1M
R185
10K
C124
10/25
+5V
W4
-18 VDC IN
+18 VDC IN
BYPASS
AUTO MUTE
GROUND
+5 VDC IN
MUTE A
MUTE B
IC19
IC20
C115
.1/100
C116
.1/100

HIGHEST REFERENCE DESIGNATORS USED					
C124	D17	IC20	J3	JW10	Q21
R193	W4				

REFERENCE DESIGNATORS NOT USED		
C1 - C108	C118 - C123	D1 - D14
IC1 - IC18	Q1 - Q14	R1 - R137
R158 - R184	R187 - R190	W1 - W3

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
3. Q21 IS MOUNTED ON A HEATSINK.

Figure 6-38. Monitor Module Logic Board (MML) Schematic

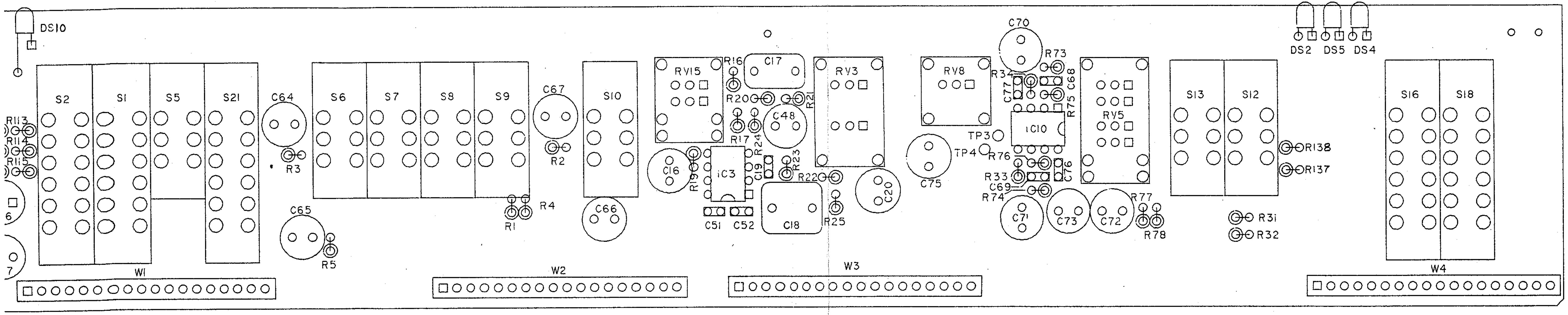
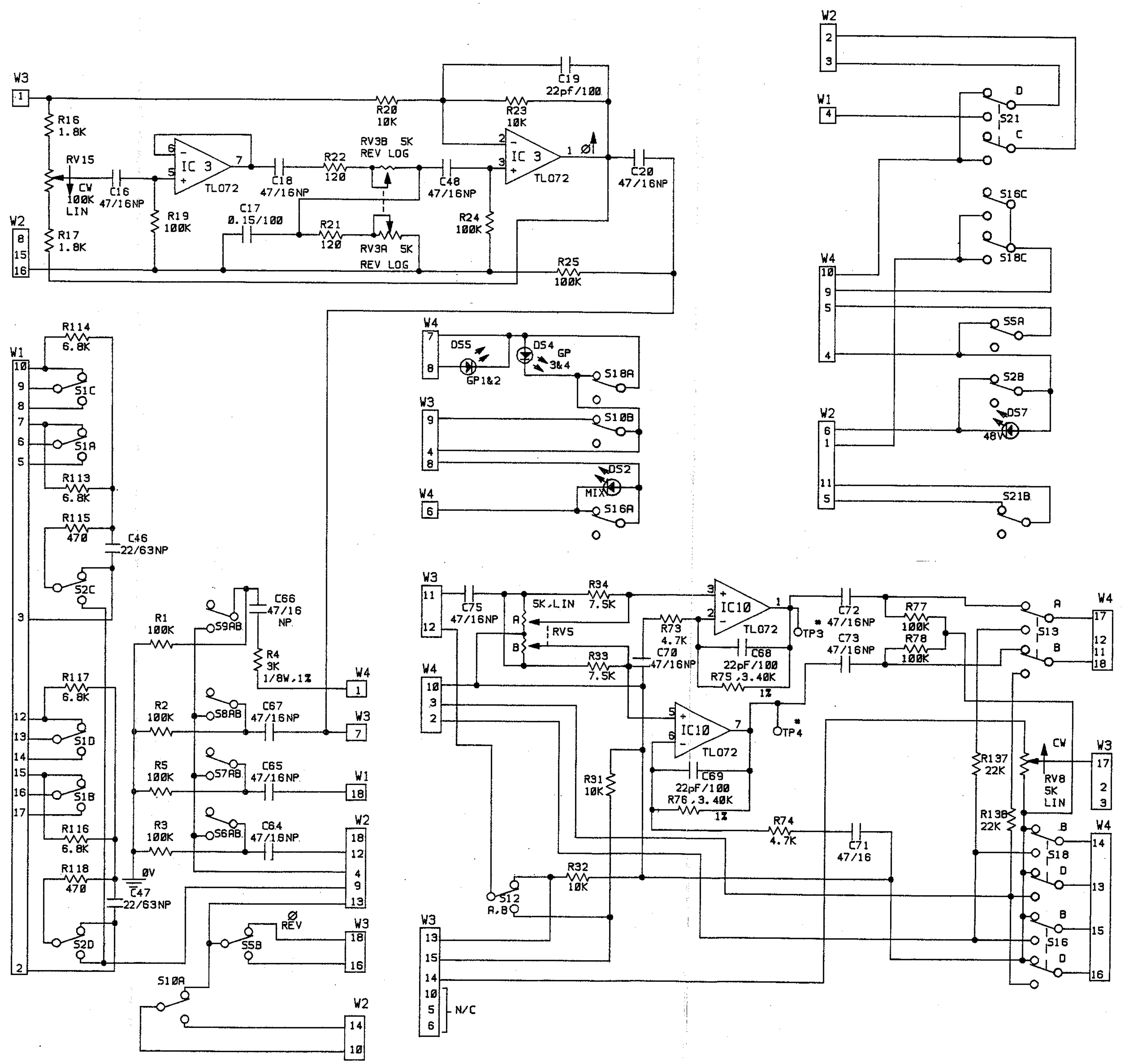

DS10
S2
S1
S5
S21
C64
S6
S7
S8
S9
C67
S10
RV15
R16
C17
RV3
RV8
C70
R73
S13
S12
S16
S18
DS2
DS5
DS4
R113
R114
R115
R3
R2
R20
R21
C48
R17
R24
R34
C77
C68
R75
RV5
IC10
TP3
TP4
R76
C75
C16
R19
IC3
C19
R23
R22
C20
R33
C69
R74
R138
R137
R4
R1
C65
R5
C66
C51
C52
C18
R25
C71
C73
C72
R77
R78
R31
R32
6
7
W1
W2
W3
W4

Figure 6-39. Input/Output Module Sub-board (IOS) Mechanical Assembly


W3
R16
1.8K
RV15
CW
100K
LIN
C16
47/16NP
IC 3
TL072
R19
100K
C18
47/16NP
R22
120
RV3B 5K
REV LOG
C17
0.15/100
R21
120
RV3A 5K
REV LOG
C48
47/16NP
R20
10K
R23
10K
C19
22pf/100
C20
47/16NP
R24
100K
R25
100K
R17
1.8K
W2
W1
R114
6.8K
S1C
S1A
R113
6.8K
R115
470
C46
22/63NP
S2C
R117
6.8K
S1D
S1B
R116
6.8K
R118
470
0V
C47
22/63NP
S2D
R1
100K
S9AB
C66
47/16
NP
R4
3K
1/8W,1%
W4
R2
100K
S8AB
C67
47/16NP
R5
100K
S7AB
C65
47/16NP
R3
100K
S6AB
C64
47/16NP
REV
S5B
S10A
DS5
GP1&2
DS4
GP
3&4
S18A
S10B
DS2
MIX
S16A
C75
47/16NP
5K,LIN
RV5
R34
7.5K
R33
7.5K
R73
4.7K
C70
47/16NP
IC10
TL072
C68
22pF/100
R75,3.40K
1%
TP3
TP4
C69
22pF/100
R76,3.40K
1%
R31
10K
R74
4.7K
C71
47/16
R32
10K
S12
A,B
C72
47/16NP
C73
47/16NP
R77
100K
R78
100K
S13
R137
22K
R138
22K
RV8
5K
LIN
S18
S16
N/C
S21
S16C
S18C
S5A
S2B
DS7
48V
S21B

NOTES: (UNLESS OTHERWISE SPECIFIED)
1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.

DECOUPLING CAPS		
IC	+15V	-15V
3	C51,.1/100	C52,.1/100

Figure 6-40. Input/Output Module Sub-board (IOS) Schematic

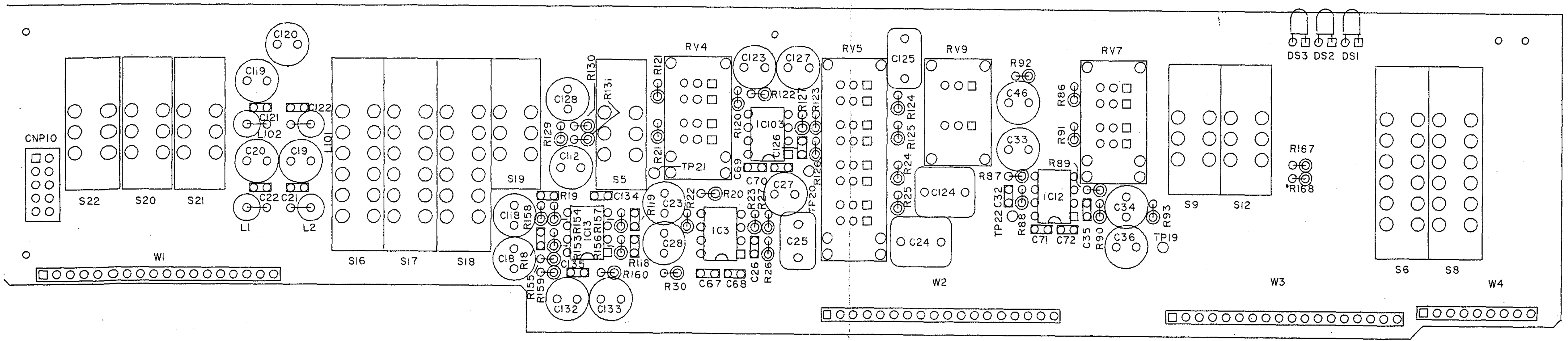

CNP10
S22
S20
S21
C120
C119
C121
C122
L102
L101
C20
C19
C22
C21
L1
L2
W1
S16
S17
S18
S19
C128
R129
R130
R131
C112
S5
R19
C134
C118
R158
C18
R18
R155
R159
R153
R154
IC13
R156
R157
C135
R118
R160
C132
C133
RV4
R121
R21
TP21
R119
C23
R22
R20
C28
IC3
R30
C67
C68
C26
R26
R23
R27
C69
R120
IC103
C126
C70
C123
C127
R122
R127
R123
R126
TP20
C27
C25
RV5
C125
R24
R125
R124
R25
C124
C24
W2
RV9
R92
C46
C33
R87
C32
TP22
R88
R89
IC12
C71
C72
C35
R90
C34
C36
R93
TP19
R86
R91
RV7
S9
S12
W3
DS3
DS2
DS1
R167
R168
S6
S8
W4

Figure 6-41. Stereo Input Module Sub-board (SIS) Mechanical Assembly

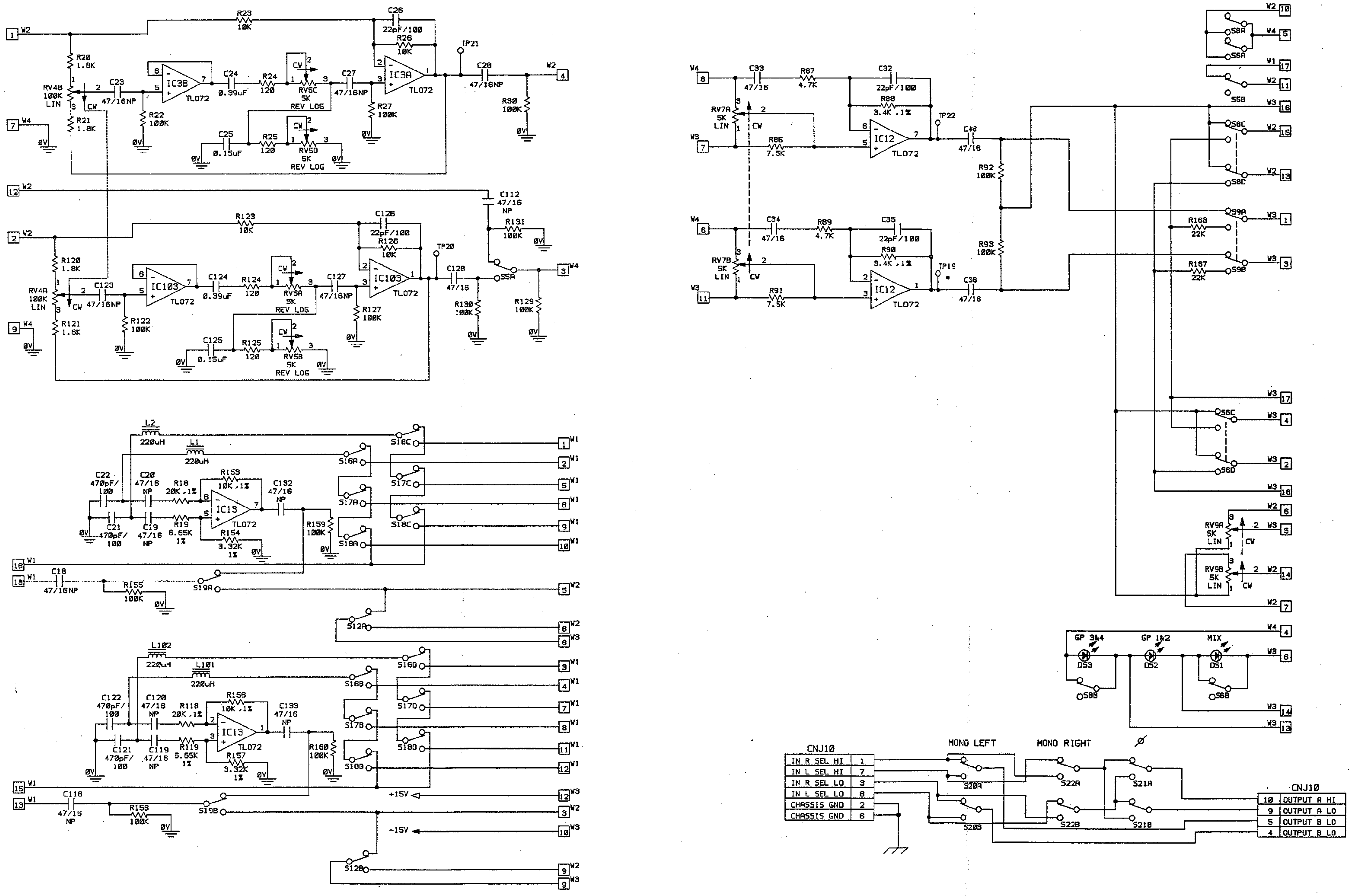

R23 10K
C26 22pF/100
R26 10K
TP21
R20 1.8K
RV4B 100K LIN
C23 47/16NP
IC3B TL072
C24 0.39uF
R24 120
RV5C 5K REV LOG
C27 47/16NP
IC3A TL072
C28 47/16NP
R30 100K
R21 1.8K
R22 100K
R27 100K
C25 0.15uF
R25 120
RV5D 5K REV LOG
C112 47/16 NP
R123 10K
C126 22pF/100
R126 10K
R131 100K
TP20
R120 1.8K
RV4A 100K LIN
C123 47/16NP
IC103 TL072
C124 0.39uF
R124 120
RV5A 5K REV LOG
C127 47/16NP
C128 47/16
S5A
R121 1.8K
R122 100K
R127 100K
R130 100K
R129 100K
C125 0.15uF
R125 120
RV5B 5K REV LOG
L2 220uH
L1 220uH
C22 470pF/100
C20 47/16 NP
R18 20K .1%
R153 10K .1%
C132 47/16 NP
IC13 TL072
C21 470pF/100
C19 47/16 NP
R19 6.65K 1%
R154 3.32K 1%
R159 100K
S16C
S16A
S17C
S17A
S18C
S18A
C18 47/16NP
R155 100K
S19A
S12A
L102 220uH
L101 220uH
C122 470pF/100
C120 47/16 NP
R118 20K .1%
R156 10K .1%
C133 47/16 NP
C121 470pF/100
C119 47/16 NP
R119 6.65K 1%
R157 3.32K 1%
R160 100K
S16D
S16B
S17D
S17B
S18D
S18B
C118 47/16 NP
R158 100K
S19B
+15V
-15V
S12B
C33 47/16
R87 4.7K
C32 22pF/100
R88 3.4K .1%
TP22
RV7A 5K LIN
R86 7.5K
IC12 TL072
C46 47/16
R92 100K
C34 47/16
R89 4.7K
C35 22pF/100
R90 3.4K .1%
TP19
RV7B 5K LIN
R91 7.5K
C36 47/16
R93 100K
S8A
S6A
S5B
S8C
S8D
S9A
R168 22K
R167 22K
S9B
S6C
S6D
RV9A 5K LIN
RV9B 5K LIN
GP 3&4
GP 1&2
MIX
DS3
DS2
DS1
S8B
S6B
CNJ10
IN R SEL HI 1
IN L SEL HI 7
IN R SEL LO 3
IN L SEL LO 8
CHASSIS GND 2
CHASSIS GND 6
MONO LEFT
MONO RIGHT
S20A
S22A
S21A
S20B
S22B
S21B
CNJ10
10 OUTPUT A HI
9 OUTPUT A LO
5 OUTPUT B LO
4 OUTPUT B LO

Figure 6-42. Stereo Input Module Sub-board (SIS) Schematic

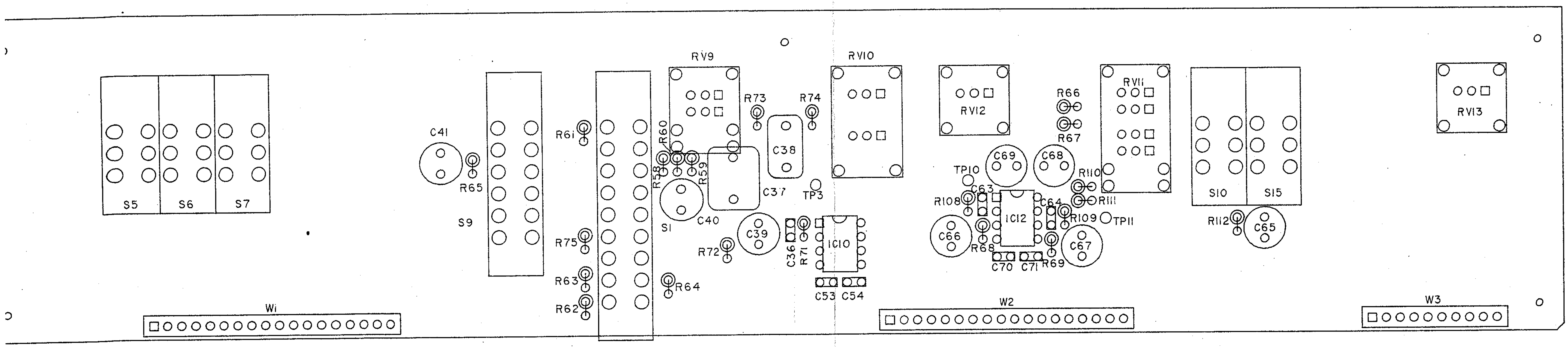
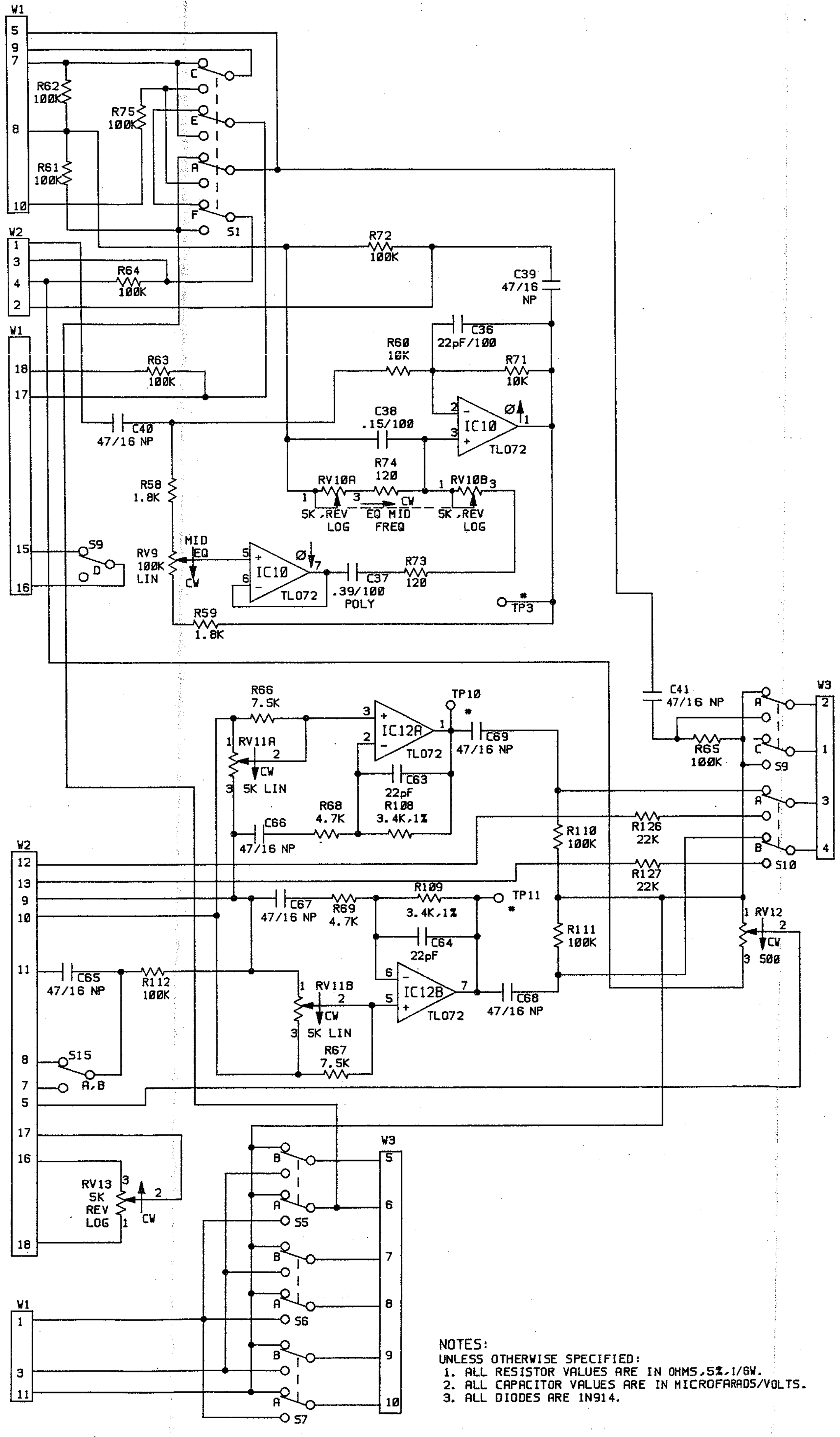
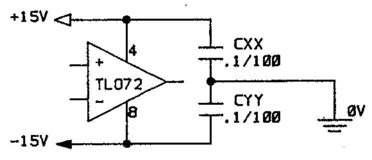

RV9
RV10
R73
R74
RV12
R66
R67
RV11
RV13
C41
R61
R60
R58
R59
C38
C37
TP3
C69
C68
TP10
R110
R111
C63
R108
C64
IC12
R109
TP11
S10
S15
R112
C65
S5
S6
S7
R65
S9
R75
S1
C40
C39
R72
C36
R71
IC10
C66
R68
C67
C70
C71
R69
R63
R62
R64
C53
C54
W1
W2
W3

Figure 6-43. Group Module Sub-board (GPS) Mechanical Assembly


W1
W2
W3
R62 100K
R61 100K
R75 100K
S1
R72 100K
R64 100K
R63 100K
C39 47/16 NP
C36 22pF/100
R60 10K
R71 10K
C38 .15/100
IC10
TL072
R74 120
RV10A 5K REV LOG
EQ MID FREQ
RV10B 5K REV LOG
C40 47/16 NP
R58 1.8K
S9
RV9 100K LIN
MID EQ
CW
C37 .39/100 POLY
R73 120
TP3
R59 1.8K
C41 47/16 NP
R65 100K
R66 7.5K
TP10
IC12A
TL072
C69 47/16 NP
RV11A 5K LIN
C63 22pF
R108 3.4K,1%
R68 4.7K
C66 47/16 NP
R110 100K
R126 22K
S10
R127 22K
R109 3.4K,1%
TP11
C67 47/16 NP
R69 4.7K
C64 22pF
R111 100K
RV12 500
C65 47/16 NP
R112 100K
RV11B 5K LIN
IC12B
TL072
C68 47/16 NP
R67 7.5K
S15
A,B
RV13 5K REV LOG
S5
S6
S7

NOTES:
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTOR VALUES ARE IN OHMS,5%,1/6W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.
3. ALL DIODES ARE 1N914.


+15V
-15V
TL072
4
8
CXX .1/100
CYY .1/100
0V

TYPICAL DECOUPLING

IC	CXX	CYY
10	53	54
12	70	71

Figure 6-44. Group Module Sub-board (GPS) Schematic

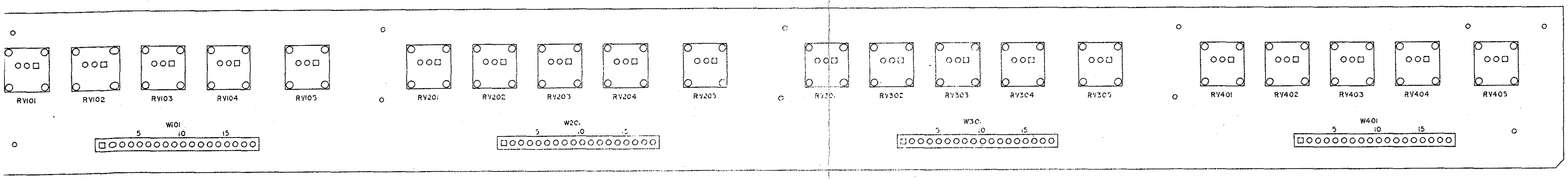

RV101
RV102
RV103
RV104
RV105
RV201
RV202
RV203
RV204
RV205
RV301
RV302
RV303
RV304
RV305
RV401
RV402
RV403
RV404
RV405
W101
W201
W301
W401
5
10
15

Figure 6-45. Dynamics Module Sub-board (DYS) Mechanical Assembly

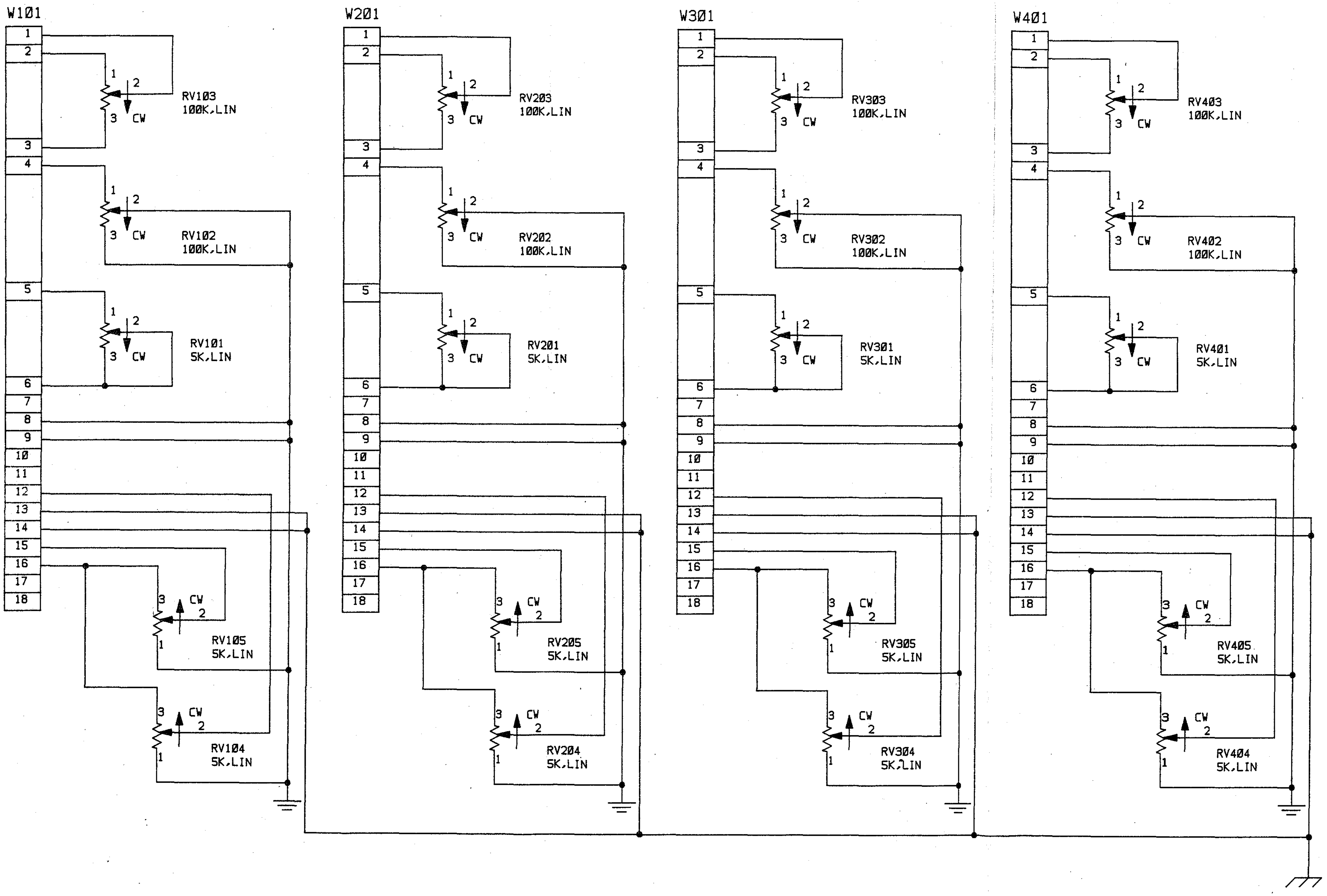

W101
W201
W301
W401
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
CW
RV103
100K,LIN
RV102
100K,LIN
RV101
5K,LIN
RV105
5K,LIN
RV104
5K,LIN
RV203
100K,LIN
RV202
100K,LIN
RV201
5K,LIN
RV205
5K,LIN
RV204
5K,LIN
RV303
100K,LIN
RV302
100K,LIN
RV301
5K,LIN
RV305
5K,LIN
RV304
5K,LIN
RV403
100K,LIN
RV402
100K,LIN
RV401
5K,LIN
RV405
5K,LIN
RV404
5K,LIN

Figure 6-46. Dynamics Module Sub-board (DYS) Schematic

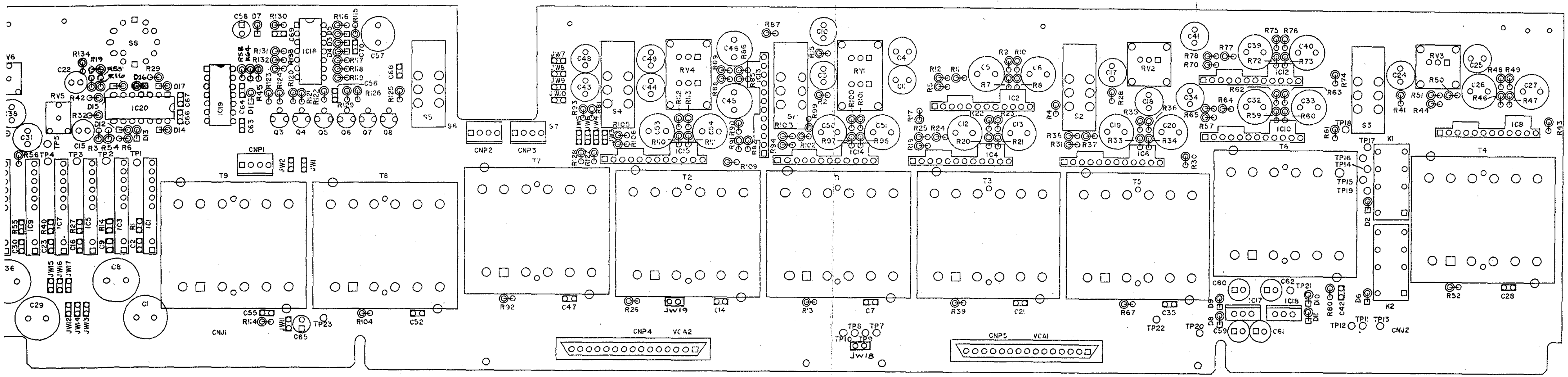
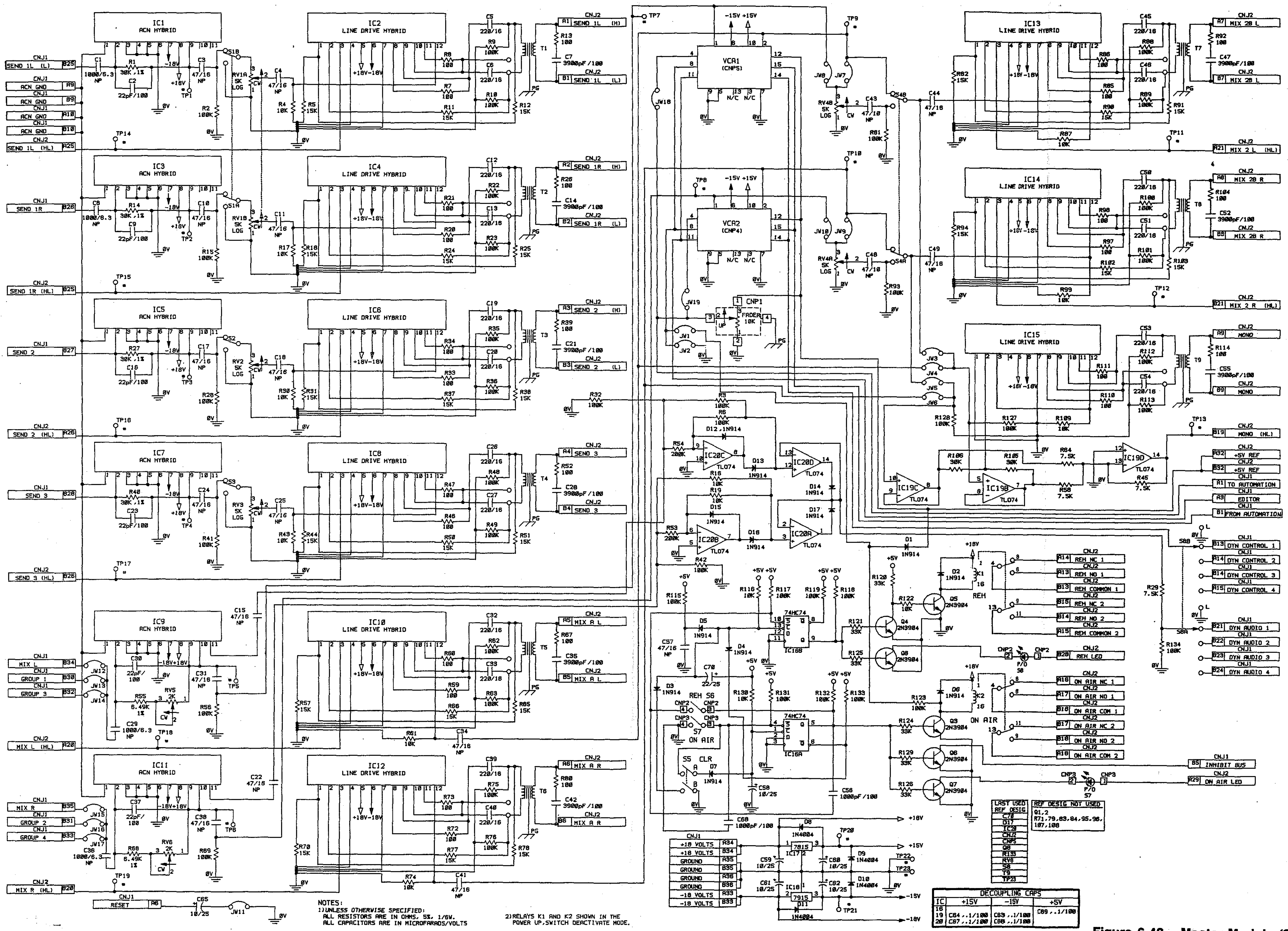

T9
T8
T7
T2
T1
T3
T5
T6
T4
CNP1
CNP2
CNP3
CNP4
VCA2
CNP5
VCA1
CNJ1
CNJ2
IC20
IC19
IC16
IC15
IC14
IC2
IC4
IC6
IC12
IC10
IC8
IC17
IC18
RV1
RV2
RV3
RV4
RV5
S2
S3
S4
S5
S6
S7
K1
K2
JW18
JW19
C1
C29
C8

Figure 6-47. Master Module (SOM) Mechanical Assembly


IC1 ACN HYBRID
IC2 LINE DRIVE HYBRID
IC3 ACN HYBRID
IC4 LINE DRIVE HYBRID
IC5 ACN HYBRID
IC6 LINE DRIVE HYBRID
IC7 ACN HYBRID
IC8 LINE DRIVE HYBRID
IC9 ACN HYBRID
IC10 LINE DRIVE HYBRID
IC11 ACN HYBRID
IC12 LINE DRIVE HYBRID
IC13 LINE DRIVE HYBRID
IC14 LINE DRIVE HYBRID
IC15 LINE DRIVE HYBRID
VCA1 (CNP5)
VCA2 (CNP4)
CNP1 FADER 10K
IC20C TL074
IC20D TL074
IC20B TL074
IC20A TL074
IC19C TL074
IC19B TL074
IC19D TL074
74HC74 IC16B
74HC74 IC16A
7815 IC17
7915 IC18
SEND 1L (L)
ACN GND
SEND 1L (HL)
SEND 1R
SEND 1R (HL)
SEND 2
SEND 2 (HL)
SEND 3
SEND 3 (HL)
MIX L
GROUP 1
GROUP 3
MIX L (HL)
MIX R
GROUP 2
GROUP 4
MIX R (HL)
RESET
SEND 1L (H)
SEND 1L (L)
SEND 1R (H)
SEND 1R (L)
SEND 2 (H)
SEND 2 (L)
SEND 3
MIX A L
MIX A R
MIX 2B L
MIX 2 L (HL)
MIX 2B R
MIX 2 R (HL)
MONO
MONO (HL)
+5V REF
TO AUTOMATION
EDITOR
FROM AUTOMATION
DYN CONTROL 1
DYN CONTROL 2
DYN CONTROL 3
DYN CONTROL 4
DYN AUDIO 1
DYN AUDIO 2
DYN AUDIO 3
DYN AUDIO 4
REH NC 1
REH NO 1
REH COMMON 1
REH NC 2
REH NO 2
REH COMMON 2
REH LED
ON AIR NC 1
ON AIR NO 1
ON AIR COM 1
ON AIR NC 2
ON AIR NO 2
ON AIR COM 2
INHIBIT BUS
ON AIR LED
REH S6
S7 ON AIR
S5 CLR
+18 VOLTS
GROUND
-18 VOLTS
+18V
+15V
-15V
-18V

NOTES:
1)UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS, 5%, 1/6W.
ALL CAPACITORS ARE IN MICROFARADS/VOLTS

2)RELAYS K1 AND K2 SHOWN IN THE POWER UP,SWITCH DEACTIVATE MODE.

LAST USED REF DESIG
C70
D17
IC20
CNJ2
CNP5
Q8
R133
RV6
S8
T9
TP23

REF DESIG NOT USED
Q1,2 R71,79,83,84,95,98, 107,108

DECOUPLING CAPS			
IC	+15V	-15V	+5V
16			C69 ..1/100
19	C64 ..1/100	C63 ..1/100	
20	C67 ..1/100	C66 ..1/100	

Figure 6-48. Master Module (SOM) Schematic

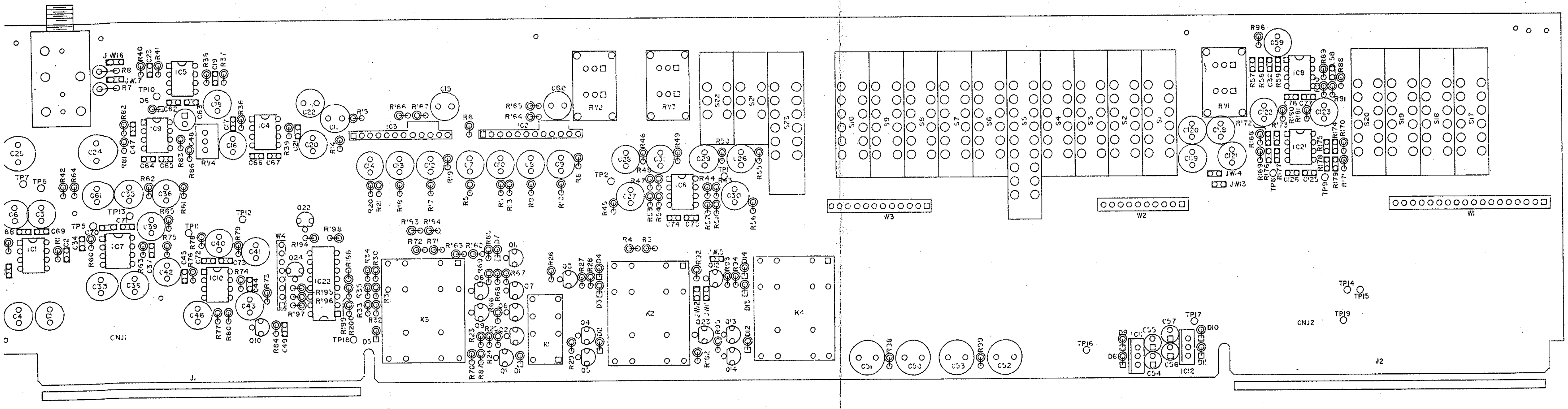
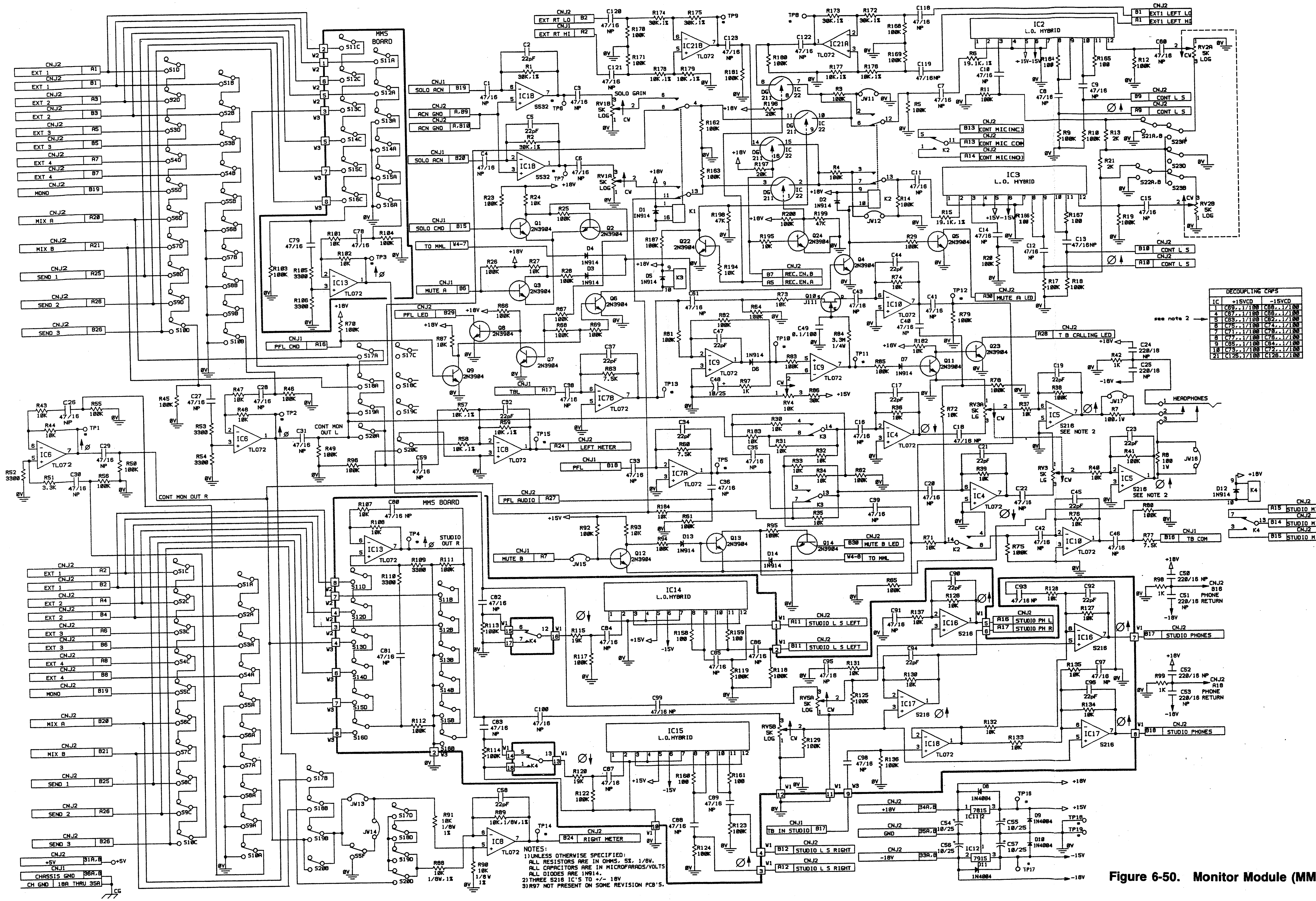

CNJ1
J1
CNJ2
J2
W1
W2
W3
W4
K1
K2
K3
K4
RY1
RY2
RY3
RY4
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC21
IC22
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S17
S18
S19
S20
S21
S22
S23
TP1
TP2
TP5
TP6
TP7
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
JW13
JW14
JW16
C50
C51
C52
C53
C54
C57
C58

Figure 6-49. **Monitor Module (MMM) Mechanical Assembly**


MMS BOARD
IC2 L.O. HYBRID
IC3 L.O. HYBRID
IC14 L.O.HYBRID
IC15 L.O.HYBRID
EXT 1
EXT 2
EXT 3
EXT 4
MONO
MIX A
MIX B
SEND 1
SEND 2
SEND 3
EXT RT LO
EXT RT HI
EXT1 LEFT LO
EXT1 LEFT HI
SOLO ACN
ACN GND
SOLO CMD
TO MML
MUTE A
MUTE B
PFL LED
PFL CMD
PFL
PFL AUDIO
TBL
LEFT METER
RIGHT METER
CONT MON OUT L
CONT MON OUT R
STUDIO OUT R
SOLO GAIN
CONT L S
CONT MIC(NC)
CONT MIC COM
CONT MIC(NO)
REC.CN.B
REC.CN.A
MUTE A LED
MUTE B LED
T B CALLING LED
HEADPHONES
SEE NOTE 2
see note 2
STUDIO MIC (NC)
STUDIO MIC COMMON
STUDIO MIC (NO)
TB COM
STUDIO L S LEFT
STUDIO L S RIGHT
STUDIO PH L
STUDIO PH R
STUDIO PHONES
PHONE RETURN
TB IN STUDIO
CHASSIS GND
CH GND
+18V
-18V
+15V
-15V
7815
7915
1N4004

NOTES:
1) UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS, 5%, 1/8W.
ALL CAPACITORS ARE IN MICROFARADS/VOLTS
ALL DIODES ARE 1N914.
2) THREE 5216 IC'S TO +/- 18V
3) R97 NOT PRESENT ON SOME REVISION PCB'S.

DECOUPLING CAPS

IC	+15VCD	-15VCD
1	C69..1/100	C68..1/100
4	C67..1/100	C66..1/100
5	C63..1/100	C62..1/100
6	C75..1/100	C74..1/100
7	C71..1/100	C70..1/100
8	C77..1/100	C76..1/100
9	C65..1/100	C64..1/100
10	C73..1/100	C72..1/100
21	C125.1/100	C126.1/100

Figure 6-50. Monitor Module (MMM) Schematic

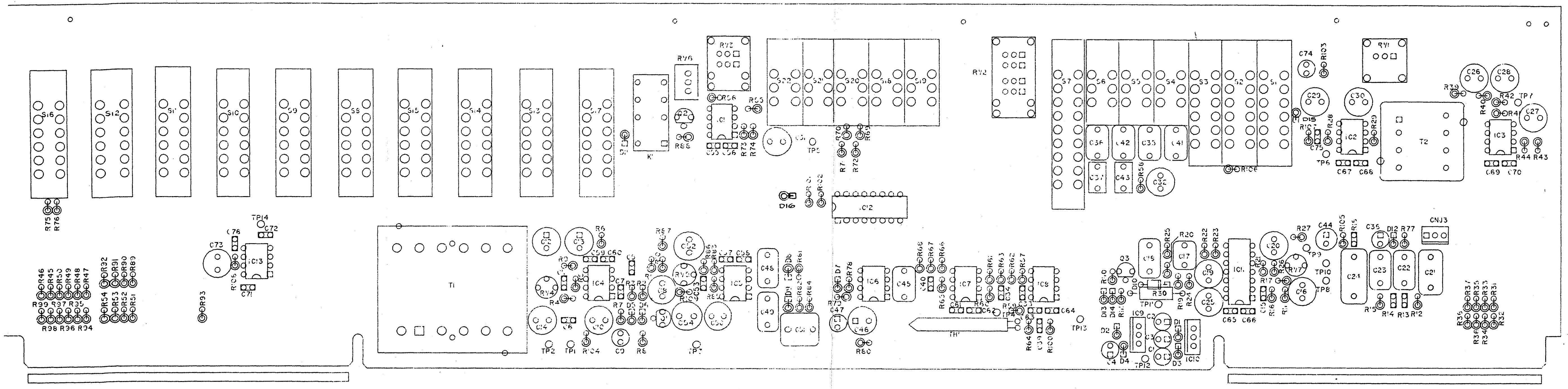
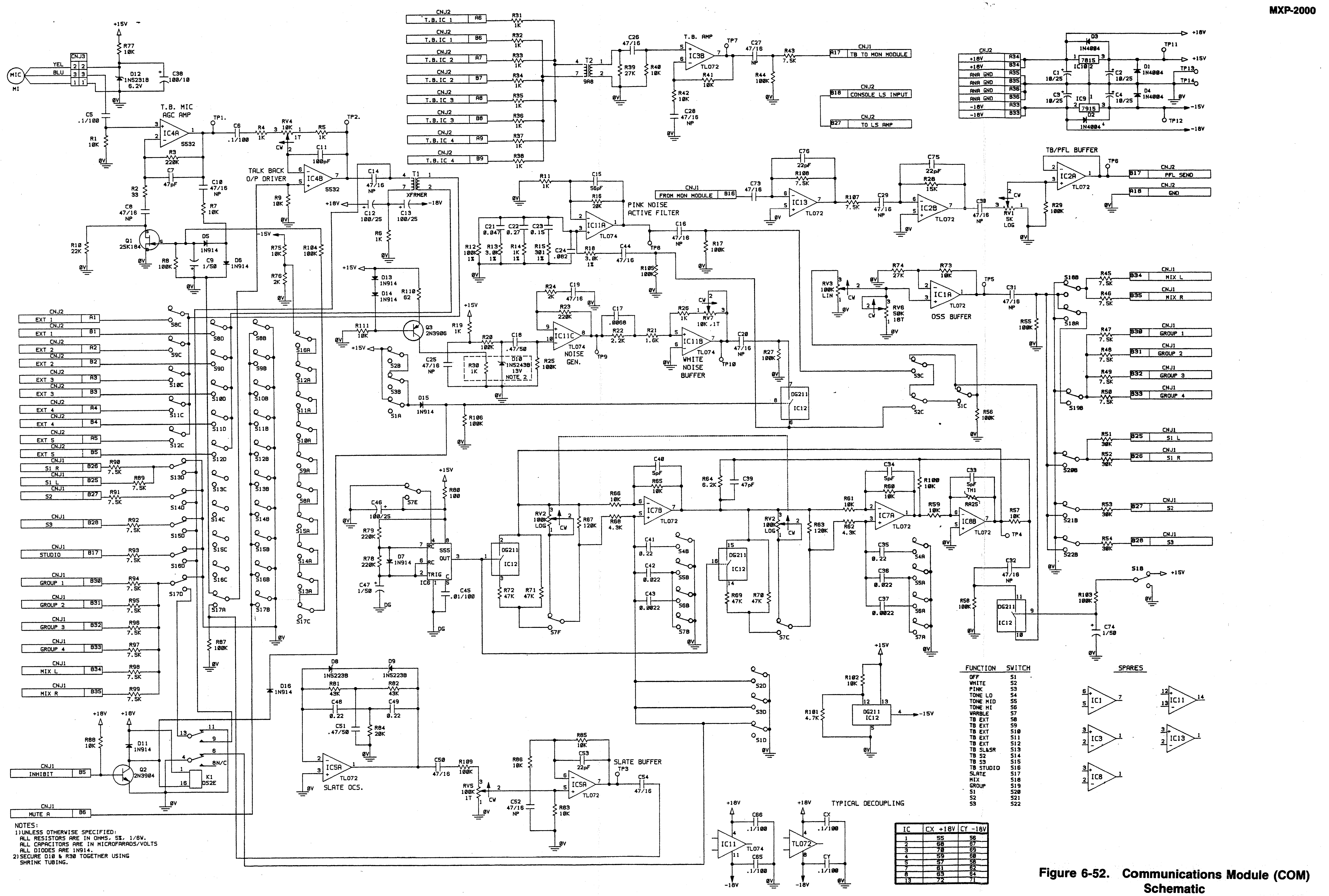

S16
S12
S10
S9
S8
S5
S4
S3
S2
S1
S7
S6
S18
S19
S20
S21
S22
K1
RY1
RY2
RY6
T1
T2
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
TH1
CNJ3
TP1
TP2
TP3
TP5
TP6
TP7
TP8
TP9
TP10
TP12
TP13
TP14
D16
R75
R76
R93
C73
C76
C72
C71
C74
C26
C28
C27
C29
C30
C21
C22
C23
C24
C36
C42
C33
C41
C37
C43
C45
C46
C48
C49
C64
C65
C66
C67
C68
C69
C70

Figure 6-51. Communications Module (COM) Mechanical Assembly


MIC
M1
T.B. MIC
AGC AMP
IC4A
5532
TALK BACK
O/P DRIVER
IC4B
XFRMER
T.B. AMP
IC3B
TB TO MON MODULE
CONSOLE LS INPUT
TO LS AMP
PINK NOISE
ACTIVE FILTER
IC11A
FROM MON MODULE
IC13
IC2B
TB/PFL BUFFER
IC2A
PFL SEND
GND
OSS BUFFER
IC1A
IC11C
NOISE
GEN.
IC11B
WHITE
NOISE
BUFFER
DG211
IC12
555
IC6
IC7B
IC7A
IC8B
SLATE OCS.
IC5A
SLATE BUFFER
K1
DS2E
INHIBIT
MUTE A
EXT 1
EXT 2
EXT 3
EXT 4
EXT 5
S1 R
S1 L
S2
S3
STUDIO
GROUP 1
GROUP 2
GROUP 3
GROUP 4
MIX L
MIX R
7815
IC10
7915
IC9
SPARES
TYPICAL DECOUPLING
+18V
-18V
+15V
-15V

NOTES:
1) UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS, 5%, 1/6W.
ALL CAPACITORS ARE IN MICROFARADS/VOLTS
ALL DIODES ARE 1N914.
2) SECURE D10 & R30 TOGETHER USING
SHRINK TUBING.

FUNCTION	SWITCH
OFF	S1
WHITE	S2
PINK	S3
TONE LO	S4
TONE MID	S5
TONE HI	S6
WARBLE	S7
TB EXT	S8
TB EXT	S9
TB EXT	S10
TB EXT	S11
TB EXT	S12
TB SL&SR	S13
TB S2	S14
TB S3	S15
TB STUDIO	S16
SLATE	S17
MIX	S18
GROUP	S19
S1	S20
S2	S21
S3	S22

IC	CX +18V	CY -18V
1	55	56
2	68	67
3	70	69
4	59	60
5	57	58
7	61	62
8	63	64
13	72	71

Figure 6-52. Communications Module (COM) Schematic

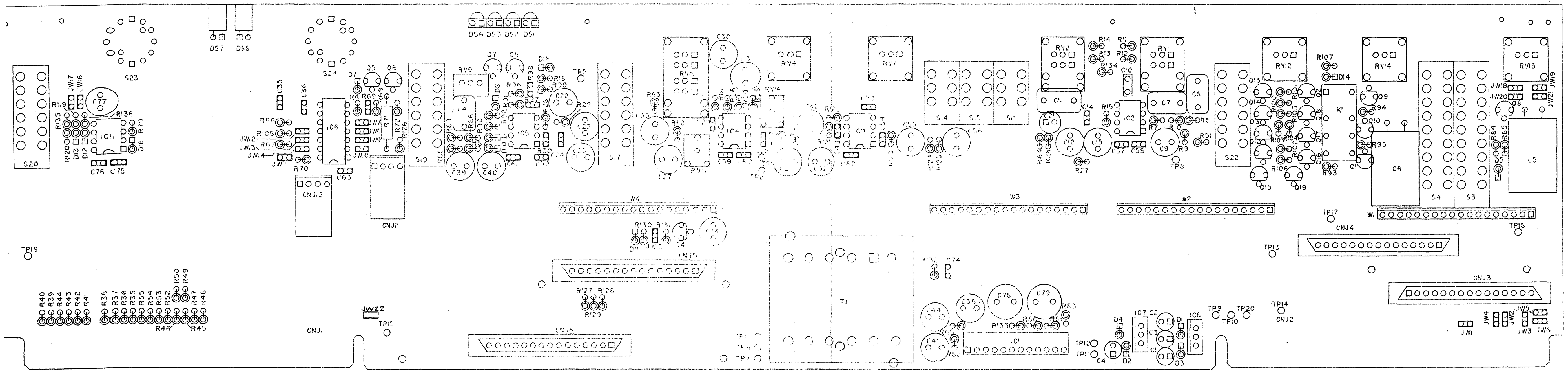
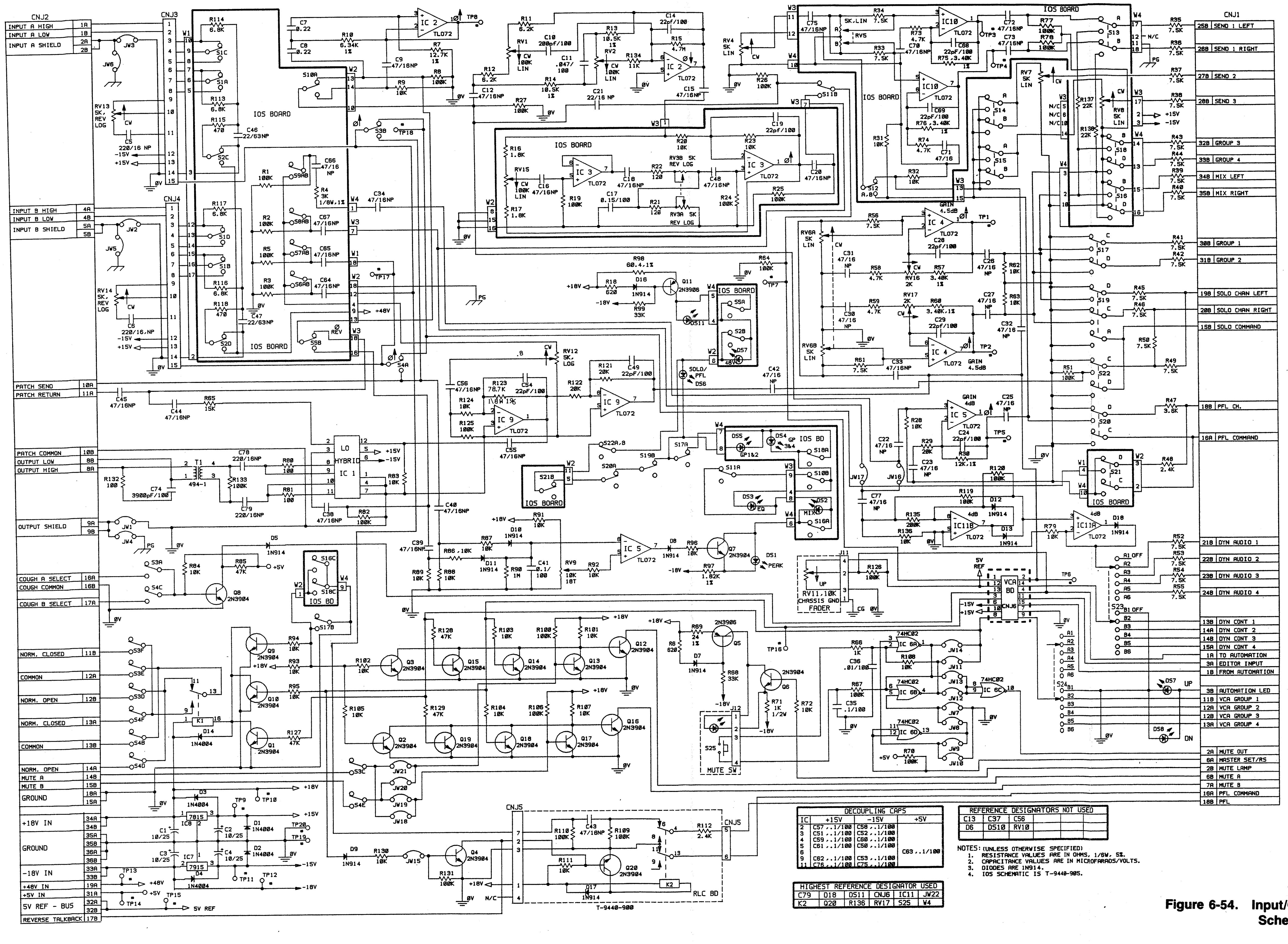

S20
S23
DS7
DS8
S24
DS4 DS3 DS2 DS1
RV9
RV6
RV4
RV7
RV2
RV1
RV12
RV14
RV13
S10
S17
S14
S15
S16
S22
S4
S3
K1
C5
C6
IC1
IC5
IC4
IC2
CNJ2
CNJ1
CNJ3
CNJ4
CNJ5
CNJ6
CNJ.
T1
W4
W3
W2
W1
TP19
TP17
TP13
TP18
TP15
TP14
TP9
TP10
TP20
JW22
JW1
JW3
JW6
R127 R126
R130
C39
C40
C27
C75
C79
C77
C76 C75
R40 R39 R44 R43 R42 R41
R35 R37 R36 R55 R54 R53 R52 R50 R49 R47 R46
R48 R45

Figure 6-53. Input/Output Module (IOM) Mechanical Assembly


CNJ2
INPUT A HIGH 1A
INPUT A LOW 1B
INPUT A SHIELD 2A 2B
INPUT B HIGH 4A
INPUT B LOW 4B
INPUT B SHIELD 5A 5B
PATCH SEND 10A
PATCH RETURN 11A
PATCH COMMON 10B
OUTPUT LOW 8B
OUTPUT HIGH 8A
OUTPUT SHIELD 9A 9B
COUGH A SELECT 16A
COUGH COMMON 16B
COUGH B SELECT 17A
NORM. CLOSED 11B
COMMON 12A
NORM. OPEN 12B
NORM. CLOSED 13A
COMMON 13B
NORM. OPEN 14A
MUTE A 14B
MUTE B 15B
GROUND 18A 15A
+18V IN 34A 34B
GROUND 35A 35B 36A 36B
-18V IN 33A 33B
+48V IN 19A
+5V IN 31A
5V REF - BUS 32A 32B
REVERSE TALKBACK 17B
CNJ3
CNJ4
IOS BOARD
CNJ1
25B SEND 1 LEFT
26B SEND 1 RIGHT
27B SEND 2
28B SEND 3
32B GROUP 3
33B GROUP 4
34B MIX LEFT
35B MIX RIGHT
30B GROUP 1
31B GROUP 2
19B SOLO CHAN LEFT
20B SOLO CHAN RIGHT
15B SOLO COMMAND
18B PFL CH.
16A PFL COMMAND
21B DYN AUDIO 1
22B DYN AUDIO 2
23B DYN AUDIO 3
24B DYN AUDIO 4
13B DYN CONT 1
14A DYN CONT 2
14B DYN CONT 3
15A DYN CONT 4
1A TO AUTOMATION
3A EDITOR INPUT
1B FROM AUTOMATION
3B AUTOMATION LED
11B VCA GROUP 1
12A VCA GROUP 2
12B VCA GROUP 3
13A VCA GROUP 4
2A MUTE OUT
6A MASTER SET/RS
2B MUTE LAMP
6B MUTE A
7A MUTE B
16A PFL COMMAND
18B PFL
HYBRID IC 1
TL072
CNJ5
RLC BD
T-9440-900
MUTE SW
FADER
VCA BD

DECOUPLING CAPS			
IC	+15V	-15V	+5V
2	C57,.1/100	C58,.1/100	
3	C51,.1/100	C52,.1/100	
4	C59,.1/100	C60,.1/100	
5	C61,.1/100	C50,.1/100	
6			C63,.1/100
9	C62,.1/100	C53,.1/100	
11	C76,.1/100	C75,.1/100	

REFERENCE DESIGNATORS NOT USED					
C13	C37	C56			
D6	DS10	RV10			

HIGHEST REFERENCE DESIGNATOR USED					
C79	D18	DS11	CNJ6	IC11	JW22
K2	Q20	R136	RV17	S25	W4

NOTES: (UNLESS OTHERWISE SPECIFIED)
1. RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
2. CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
3. DIODES ARE 1N914.
4. IOS SCHEMATIC IS T-9440-905.

Figure 6-54. Input/Output Module (IOM) Schematic

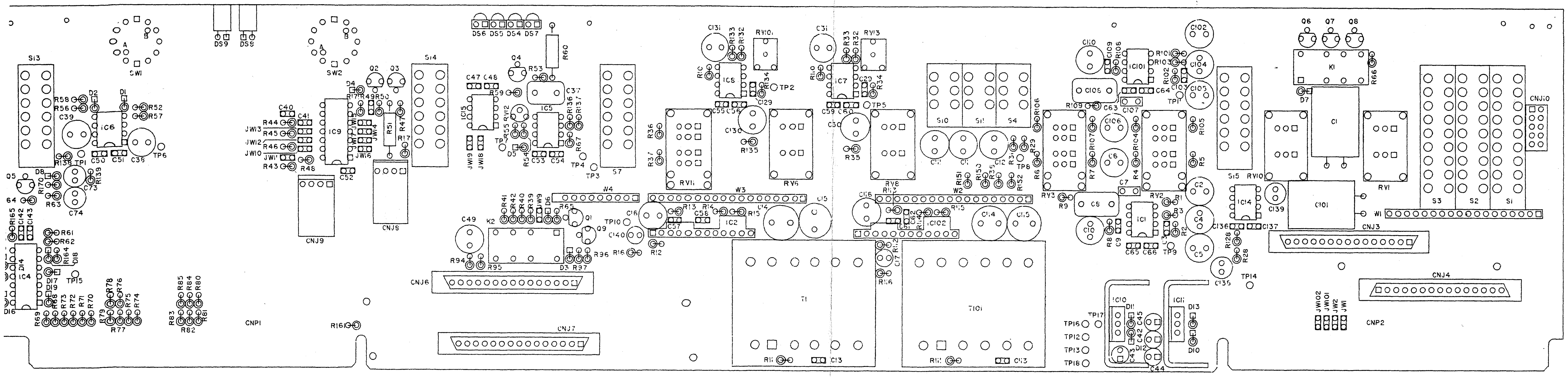
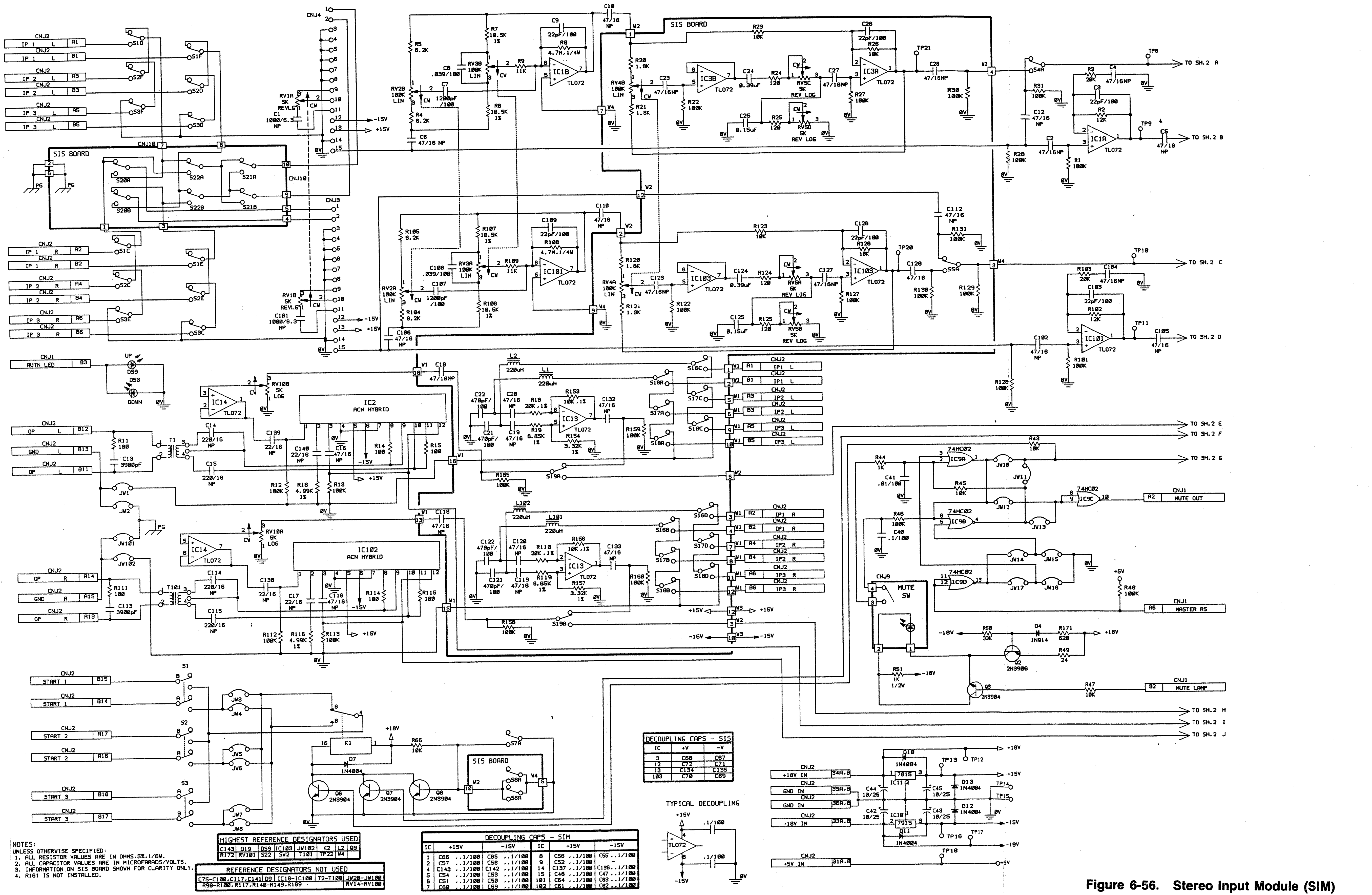

SW1
SW2
DS9
DS8
DS6 DS5 DS4 DS7
S13
S14
S7
S10
S11
S4
S15
S3
S2
S1
IC6
IC9
IC5
IC15
IC7
IC1
IC2
IC4
IC14
IC101
IC102
IC10
IC11
RV1
RV2
RV3
RV6
RV8
RV10
RV11
RV13
RV101
K1
K2
T1
T101
C1
C101
CNJ3
CNJ4
CNJ6
CNJ7
CNJ8
CNJ9
CNJ10
CNP1
CNP2
W1
W2
W3
W4
TP1
TP2
TP3
TP4
TP5
TP6
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
JW1
JW2
JW101
JW102
JW10
JW11
JW12
JW13
R60
R66
R161
R94
R95
R96
R97
C49
C44
C39
C35
C74

Figure 6-55. Stereo Input Module (SIM)
Mechanical Assembly


SIS BOARD
CNJ2
IP 1 L
IP 2 L
IP 3 L
IP 1 R
IP 2 R
IP 3 R
CNJ4
CNJ10
CNJ3
CNJ1
AUTN LED
UP
DOWN
D59
D58
OP L
GND L
OP R
GND R
T1
T101
IC2
ACN HYBRID
IC102
ACN HYBRID
IC14
TL072
IC1B
IC1A
IC3A
IC3B
IC101
IC103
IC13
TL072
RV1A
RV1B
RV2B
RV2A
RV3B
RV3A
RV4B
RV4A
RV5C
RV5D
RV5A
RV5B
REV LOG
RV10B
RV10A
5K LOG
TP8
TP9
TP10
TP11
TP20
TP21
TO SH.2 A
TO SH.2 B
TO SH.2 C
TO SH.2 D
TO SH.2 E
TO SH.2 F
TO SH.2 G
TO SH.2 H
TO SH.2 I
TO SH.2 J
74HC02
IC9A
IC9B
IC9C
IC9D
CNJ9
MUTE SW
MUTE OUT
MASTER RS
MUTE LAMP
Q2 2N3906
Q3 2N3904
Q6 2N3904
Q7 2N3904
Q8 2N3904
K1
D7 1N4004
START 1
START 2
START 3
S1
S2
S3
+15V
-15V
+18V
-18V
0V
+18V IN
GND IN
-18V IN
+5V IN
7815
7915
IC11
IC10
1N4004
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TYPICAL DECOUPLING
+15V
-15V
.1/100
TL072

NOTES:
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTOR VALUES ARE IN OHMS,5%,1/6W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.
3. INFORMATION ON SIS BOARD SHOWN FOR CLARITY ONLY.
4. R161 IS NOT INSTALLED.

HIGHEST REFERENCE DESIGNATORS USED

C143	D19	DS9	IC103	JW102	K2	L2	Q9
R172	RV101	S22	SW2	T101	TP22	W4	

REFERENCE DESIGNATORS NOT USED

C75-C100,C117,C141	D9	IC16-IC100	T2-T100	JW20-JW100
R98-R100,R117,R140-R149,R169				RV14-RV100

DECOUPLING CAPS - SIM

IC	+15V	-15V	IC	+15V	-15V
1	C66 ..1/100	C65 ..1/100	8	C56 ..1/100	C55 ..1/100
2	C57 ..1/100	C58 ..1/100	9	C52 ..1/100	-
4	C143 ..1/100	C142 ..1/100	14	C137 ..1/100	C136..1/100
5	C54 ..1/100	C53 ..1/100	15	C48 ..1/100	C47 ..1/100
6	C51 ..1/100	C50 ..1/100	101	C64 ..1/100	C63 ..1/100
7	C60 ..1/100	C59 ..1/100	102	C61 ..1/100	C62 ..1/100

DECOUPLING CAPS - SIS

IC	+V	-V
3	C68	C67
12	C72	C71
13	C134	C135
103	C70	C69

Figure 6-56. Stereo Input Module (SIM) Schematic (Sheet 1 of 2)

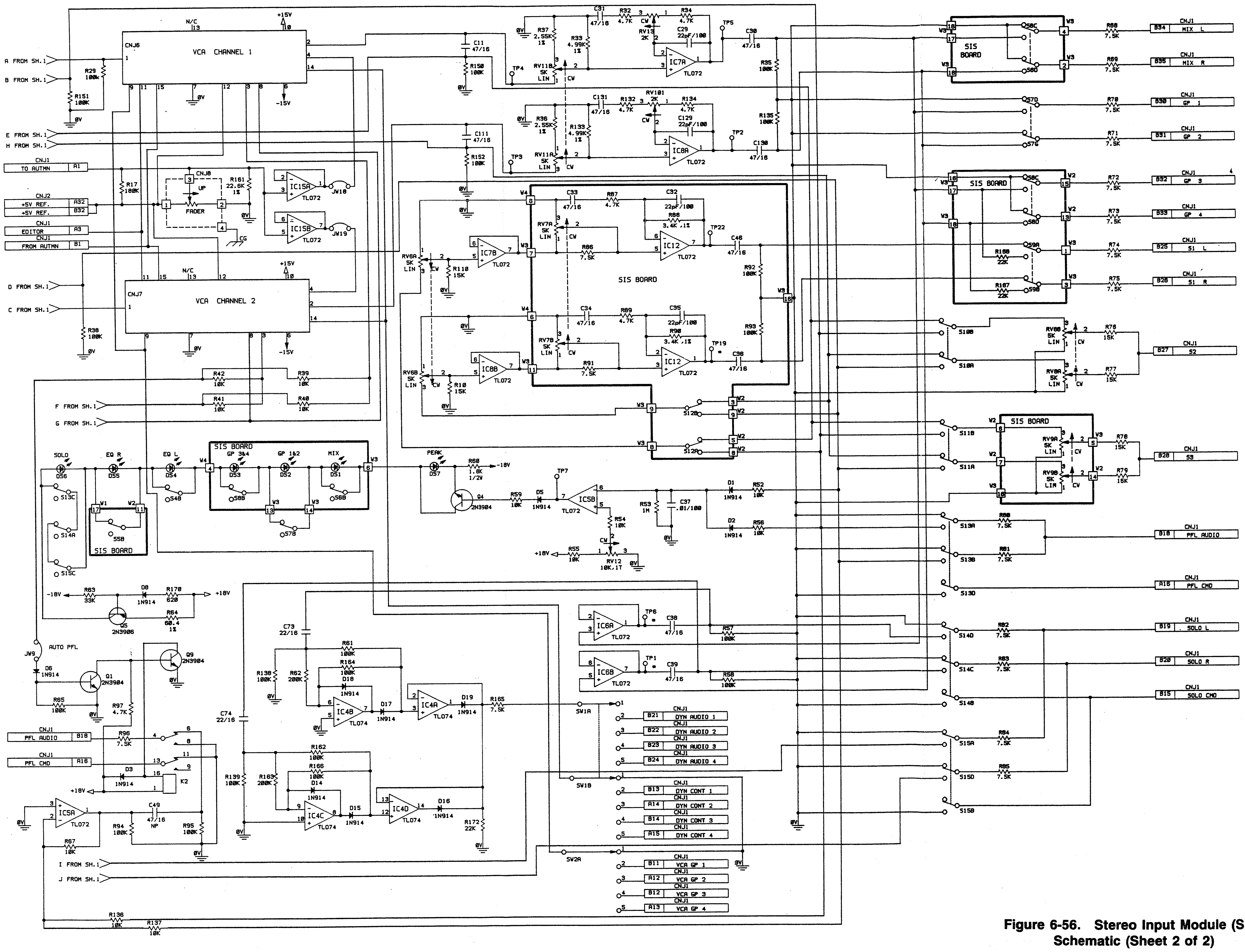

VCA CHANNEL 1
VCA CHANNEL 2
CNJ6
CNJ7
CNJ8
A FROM SH.1
B FROM SH.1
C FROM SH.1
D FROM SH.1
E FROM SH.1
F FROM SH.1
G FROM SH.1
H FROM SH.1
I FROM SH.1
J FROM SH.1
TO AUTMN
+5V REF.
EDITOR
FROM AUTMN
FADER
IC15A
IC15B
IC7A
IC8A
IC7B
IC8B
IC12
IC5B
IC5A
IC6A
IC6B
IC4A
IC4B
IC4C
IC4D
TL072
TL074
SIS BOARD
SOLO
EQ R
EQ L
GP 3&4
GP 1&2
MIX
PEAK
AUTO PFL
2N3904
2N3906
1N914
K2
PFL AUDIO
PFL CMD
MIX L
MIX R
GP 1
GP 2
GP 3
GP 4
S1 L
S1 R
S2
S3
SOLO L
SOLO R
SOLO CMD
DYN AUDIO 1
DYN AUDIO 2
DYN AUDIO 3
DYN AUDIO 4
DYN CONT 1
DYN CONT 2
DYN CONT 3
DYN CONT 4
VCA GP 1
VCA GP 2
VCA GP 3
VCA GP 4
SW1A
SW1B
SW2A
+15V
-15V
+18V
-18V
0V

Figure 6-56. Stereo Input Module (SIM) Schematic (Sheet 2 of 2)

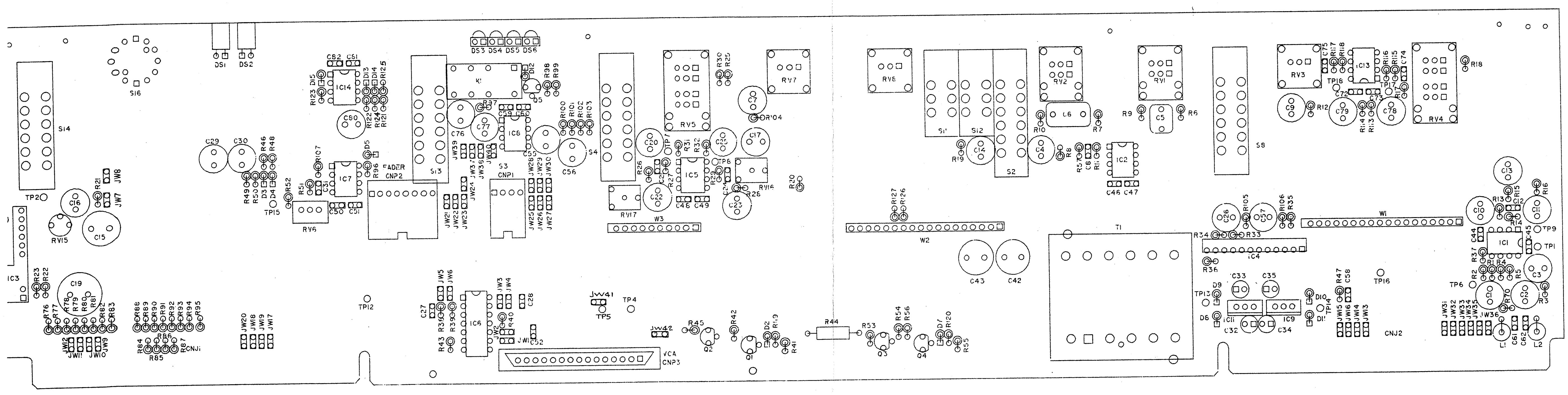
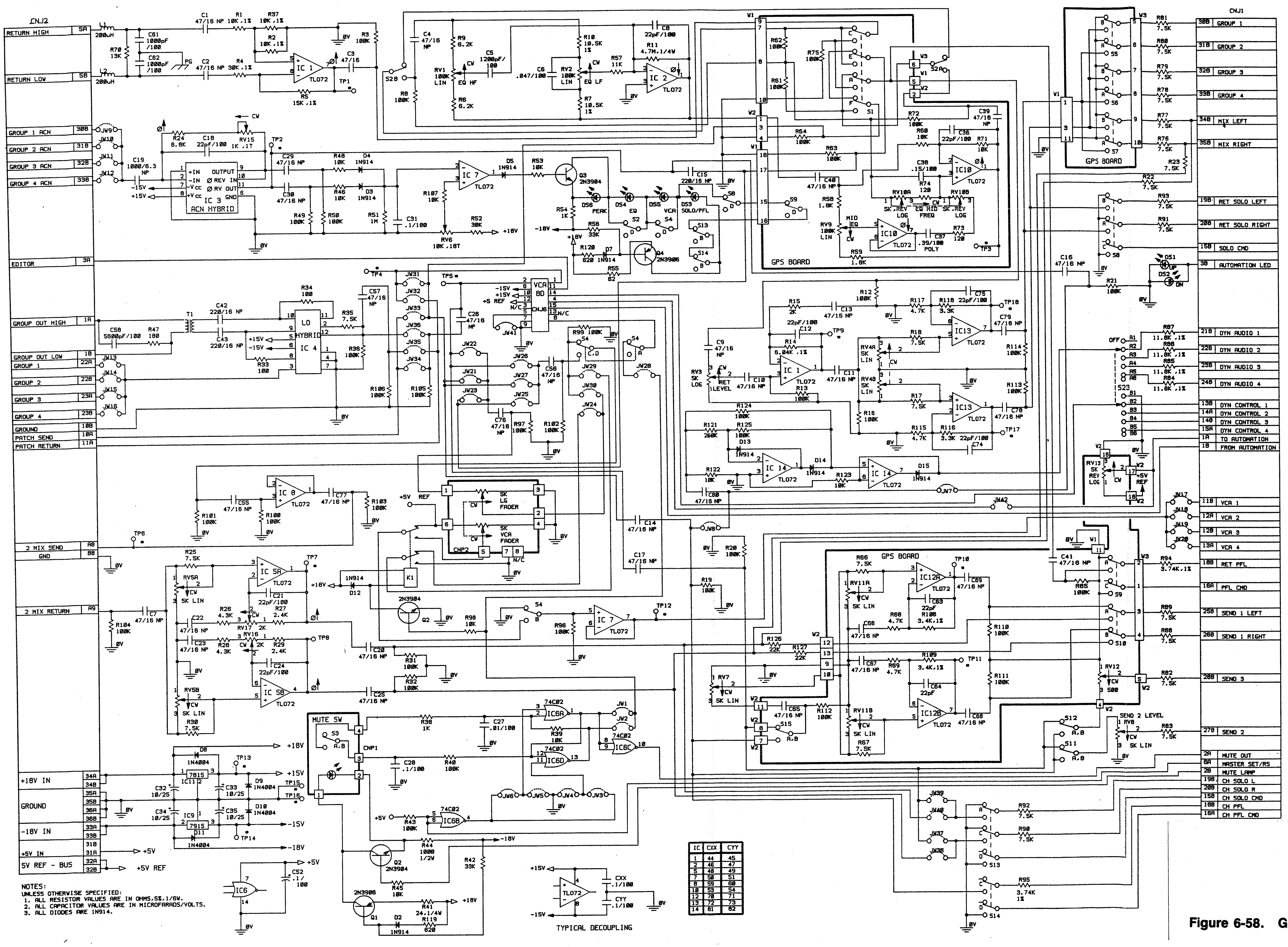

DS1
DS2
S16
S14
TP2
RV15
C16
C15
IC3
R23
R22
C19
R21
JW8
JW7
R76
R77
R78
R79
R80
R81
R82
R83
JW12
JW11
JW9
JW10
R84
R85
R86
R87
R88
R89
R90
R91
R92
R93
R94
R95
CNJ1
JW20
JW18
JW19
JW17
C29
C30
R46
R48
R49
R50
D3
D4
TP15
R52
R51
C31
R107
IC7
C50
C51
RV6
R123
D15
C62
C61
IC14
D13
D14
R125
R122
R124
R121
C80
D5
R36
FADER
CNP2
TP12
S13
K1
R37
C76
C77
JW39
JW37
JW38
JW40
JW21
JW22
JW23
JW24
DS3
DS4
DS5
DS6
D12
R98
R99
D5
C59
C60
IC8
C55
S3
CNP1
JW26
JW28
JW29
JW30
JW25
JW27
R100
R101
R102
R103
S4
C56
C27
JW5
JW6
JW3
JW4
R43
R35
R39
IC6
R40
JW2
JW1
C28
C52
JW41
TP5
TP4
JW42
IC4
CNP3
R26
R27
RV17
W3
C20
C22
C21
TP7
R31
R32
IC5
C46
C49
TP6
R29
R30
R25
RV5
C7
R104
C18
C17
RV16
R28
C23
R20
RV7
R45
Q2
R42
Q1
D2
R19
R41
R44
R53
Q3
R54
R56
Q4
D7
R120
R55
RV8
R127
R126
W2
S1
S12
S2
R19
C14
C43
C42
RV2
L6
R10
C4
R8
R7
R5
C8
R11
IC2
C46
C47
T1
RV1
C5
R9
R6
S8
R34
R33
C26
R105
C27
R106
R35
R36
TP13
C33
C35
D9
D6
IC11
IC9
C32
C34
D10
D11
TP14
R47
C58
JW15
JW16
JW14
JW13
TP16
CNJ2
RV3
C75
R117
R118
IC13
R116
R115
C74
TP16
TP17
C9
R12
C79
C78
R114
R113
R17
RV4
W1
R18
C13
R16
R13
R15
C12
C10
C11
R14
TP9
C44
C45
IC1
TP1
R37
R2
R1
R4
R5
C3
TP6
R70
C2
C30
R3
JW31
JW32
JW33
JW34
JW35
JW36
C61
C62
L1
L2

Figure 6-57. Group Module (GPM) Mechanical Assembly


CNJ2
RETURN HIGH
RETURN LOW
GROUP 1 ACN
GROUP 2 ACN
GROUP 3 ACN
GROUP 4 ACN
EDITOR
GROUP OUT HIGH
GROUP OUT LOW
GROUP 1
GROUP 2
GROUP 3
GROUP 4
GROUND
PATCH SEND
PATCH RETURN
2 MIX SEND
GND
2 MIX RETURN
+18V IN
GROUND
-18V IN
+5V IN
5V REF - BUS
IC 3 ACN HYBRID
IC 4 LO HYBRID
VCA BD
GPS BOARD
MUTE SW
TYPICAL DECOUPLING
CNJ1
GROUP 1
GROUP 2
GROUP 3
GROUP 4
MIX LEFT
MIX RIGHT
RET SOLO LEFT
RET SOLO RIGHT
SOLO CMD
AUTOMATION LED
DYN AUDIO 1
DYN AUDIO 2
DYN AUDIO 3
DYN AUDIO 4
DYN CONTROL 1
DYN CONTROL 2
DYN CONTROL 3
DYN CONTROL 4
TO AUTOMATION
FROM AUTOMATION
VCA 1
VCA 2
VCA 3
VCA 4
RET PFL
PFL CMD
SEND 1 LEFT
SEND 1 RIGHT
SEND 3
SEND 2
MUTE OUT
MASTER SET/RS
MUTE LAMP
CH SOLO L
CH SOLO R
CH SOLO CMD
CH PFL
CH PFL CMD

NOTES:
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTOR VALUES ARE IN OHMS,5%,1/6W.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.
3. ALL DIODES ARE 1N914.

IC	CXX	CYY
1	44	45
2	46	47
5	48	49
7	50	51
8	59	60
10	53	54
12	70	71
13	72	73
14	81	82

Figure 6-58. Group Module (GPM) Schematic

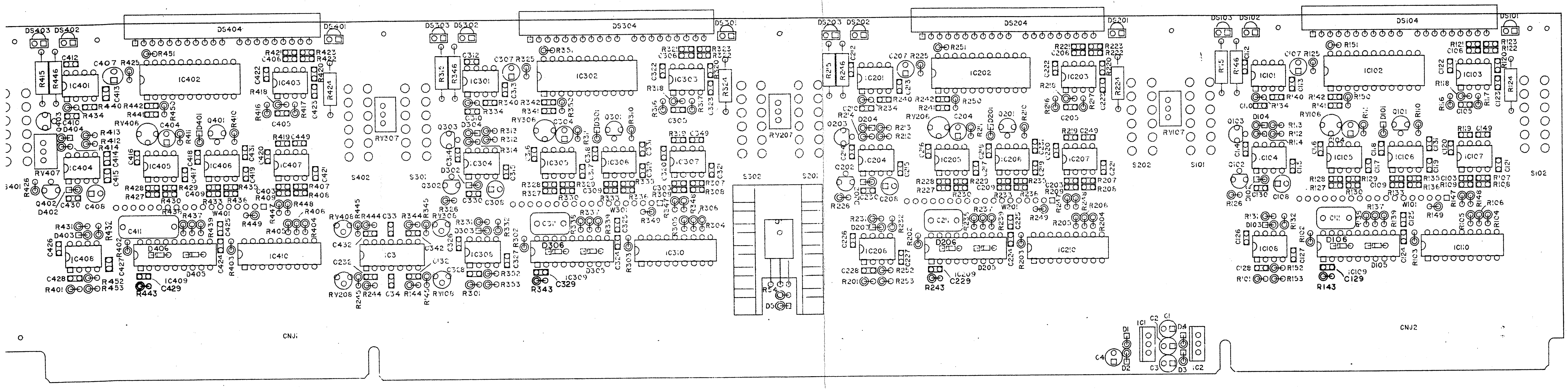
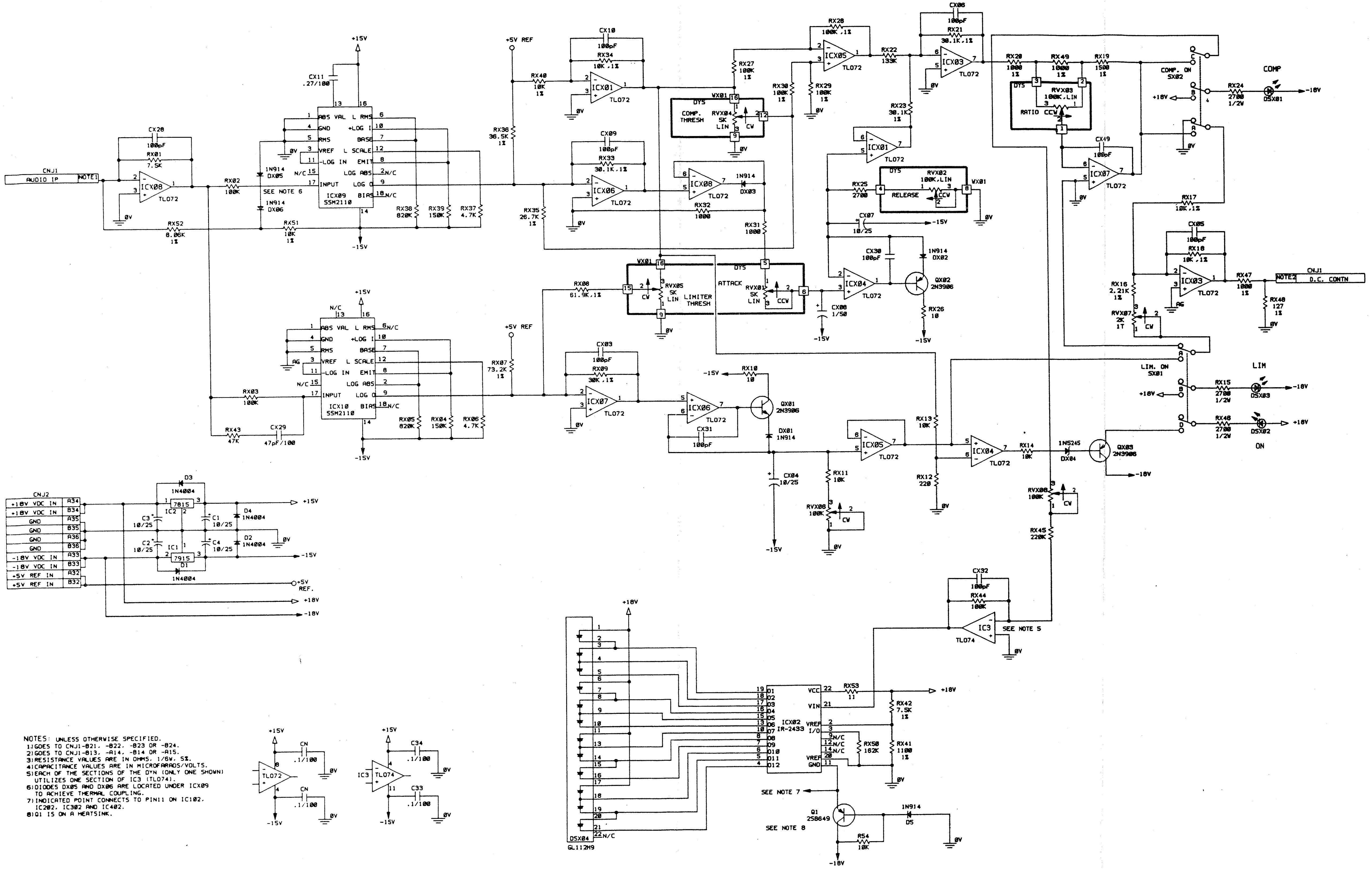

DS403
DS402
DS404
DS401
DS303
DS302
DS304
DS301
DS203
DS202
DS204
DS201
DS103
DS102
DS104
DS101
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC408
IC409
IC410
IC301
IC302
IC303
IC304
IC305
IC306
IC307
IC308
IC309
IC310
IC201
IC202
IC203
IC204
IC205
IC206
IC207
IC208
IC209
IC210
IC101
IC102
IC103
IC104
IC105
IC106
IC107
IC108
IC109
IC110
RY407
RY307
RY207
RY107
S401
S402
S301
S302
S201
S202
S101
S102
IC1
IC2
CNJ1
CNJ2

Figure 6-59. Dynamics Module (DYN) Mechanical Assembly


CNJ1
AUDIO IP
NOTE1
ICX08
TL072
ICX09
SSM2110
ICX10
SSM2110
ICX01
ICX06
ICX07
ICX05
ICX03
ICX04
COMP. THRESH
RVX04 5K LIN
LIMITER THRESH
RVX05 5K LIN
ATTACK
RVX01 5K LIN
RELEASE
RVX02 100K.LIN
RATIO
RVX03 100K.LIN
COMP. ON SX02
COMP
DSX01
LIM. ON SX01
LIM
DSX03
DSX02
ON
QX01 2N3906
QX02 2N3906
QX03 2N3906
D.C. CONTN
NOTE2
CNJ2
+18V VDC IN
GND
-18V VDC IN
+5V REF IN
IC2 7815
IC1 7915
IC3 TL074
SEE NOTE 5
ICX02 IR-2433
DSX04 GL112M9
Q1 2SB649
SEE NOTE 7
SEE NOTE 8
+15V
-15V
+18V
-18V
+5V REF
0V

NOTES: UNLESS OTHERWISE SPECIFIED.
1) GOES TO CNJ1-B21, -B22, -B23 OR -B24.
2) GOES TO CNJ1-B13, -A14, -B14 OR -A15.
3) RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
4) CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.
5) EACH OF THE SECTIONS OF THE DYN (ONLY ONE SHOWN) UTILIZES ONE SECTION OF IC3 (TL074).
6) DIODES DX05 AND DX06 ARE LOCATED UNDER ICX09 TO ACHIEVE THERMAL COUPLING.
7) INDICATED POINT CONNECTS TO PIN11 ON IC102, IC202, IC302 AND IC402.
8) Q1 IS ON A HEATSINK.

DECOUPLING CAPS		
IC	+15V	-15V
X01	CX12 .1/100	CX13 .1/100
X03	CX22 .1/100	CX23 .1/100
X04	CX14 .1/100	CX15 .1/100
X05	CX16 .1/100	CX17 .1/100
X06	CX18 .1/100	CX19 .1/100
X07	CX20 .1/100	CX21 .1/100
X08	CX26 .1/100	CX27 .1/100
X09	CX24 .1/100	CX25 .1/100

Figure 6-60. Dynamics Module (DYN)Schematic

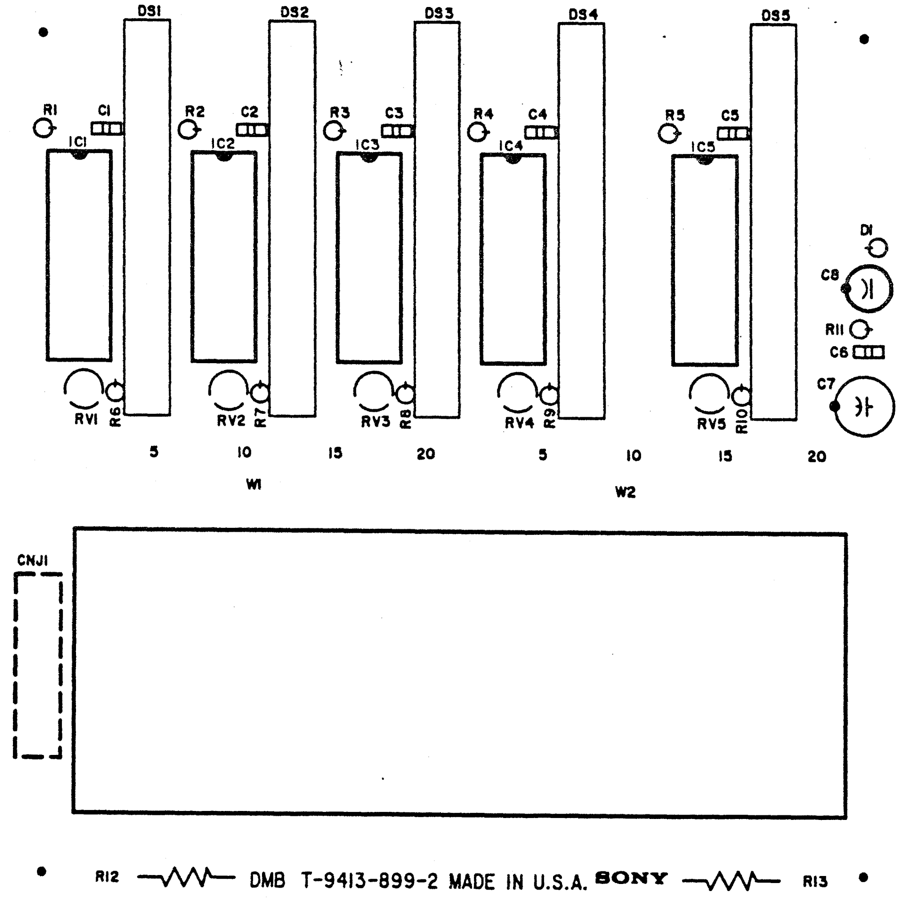
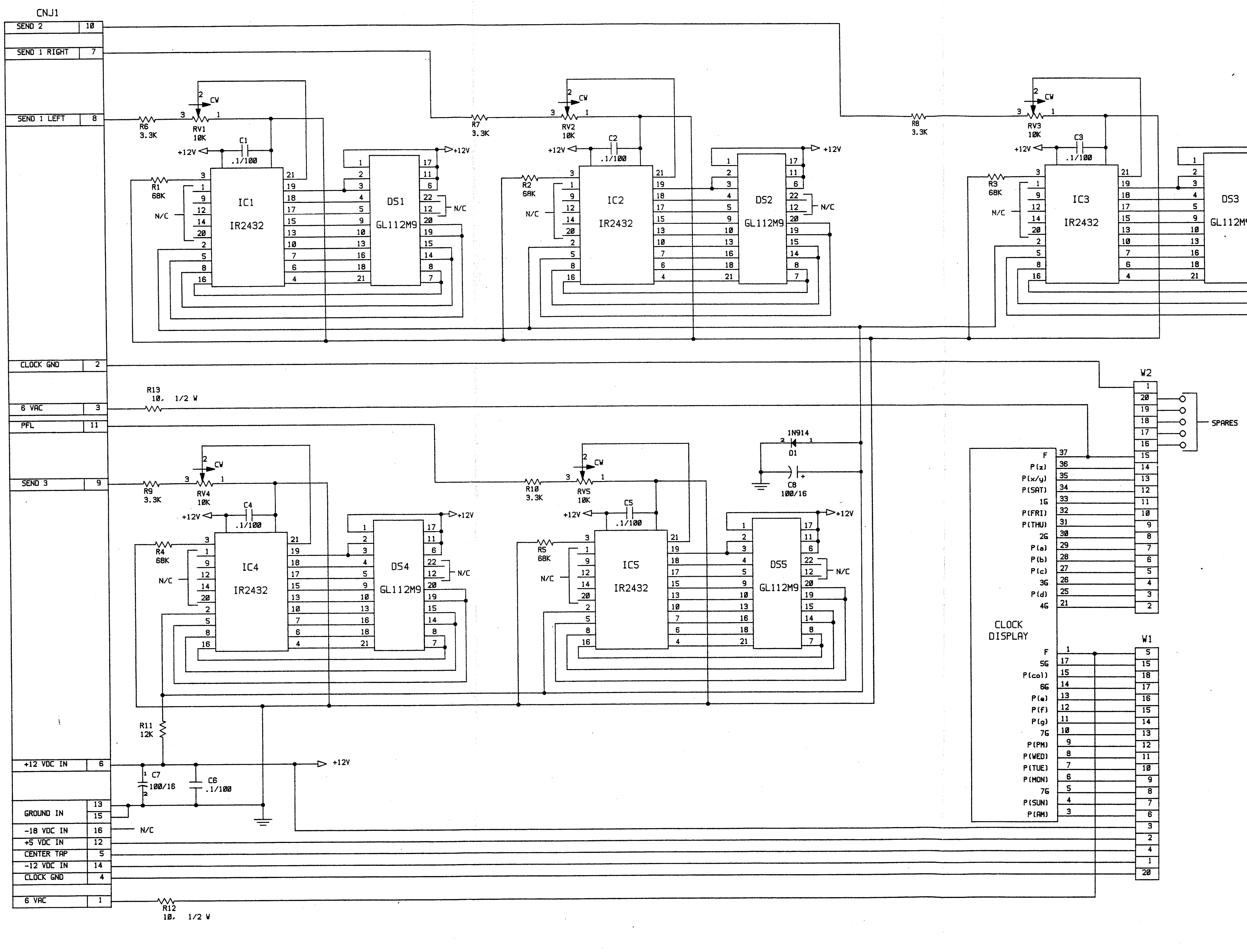

DS1
DS2
DS3
DS4
DS5
R1
C1
IC1
R2
C2
IC2
R3
C3
IC3
R4
C4
IC4
R5
C5
IC5
D1
C8
R11
C6
C7
RV1
R6
RV2
R7
RV3
R8
RV4
R9
RV5
R10
5
10
15
20
W1
5
10
15
20
W2
CNJ1
R12
DMB T-9413-899-2 MADE IN U.S.A. SONY
R13

Figure 6-61. Display Mother Board (DMB)
Mechanical Assembly


CNJ1
SEND 2 10
SEND 1 RIGHT 7
SEND 1 LEFT 8
CLOCK GND 2
6 VAC 3
PFL 11
SEND 3 9
+12 VDC IN 6
GROUND IN 13 15
-18 VDC IN 16
+5 VDC IN 12
CENTER TAP 5
-12 VDC IN 14
CLOCK GND 4
6 VAC 1
N/C
R6 3.3K
R7 3.3K
R8 3.3K
R9 3.3K
R10 3.3K
RV1 10K
RV2 10K
RV3 10K
RV4 10K
RV5 10K
CW
R1 68K
R2 68K
R3 68K
R4 68K
R5 68K
C1 .1/100
C2 .1/100
C3 .1/100
C4 .1/100
C5 .1/100
+12V
IC1 IR2432
IC2 IR2432
IC3 IR2432
IC4 IR2432
IC5 IR2432
DS1 GL112M9
DS2 GL112M9
DS3 GL112M9
DS4 GL112M9
DS5 GL112M9
R13 10. 1/2 W
R12 10. 1/2 W
R11 12K
C7 100/16
C6 .1/100
1N914 D1
C8 100/16
W2
SPARES
W1
CLOCK DISPLAY
F
P(z)
P(x/y)
P(SAT)
1G
P(FRI)
P(THU)
2G
P(a)
P(b)
P(c)
3G
P(d)
4G
5G
P(col)
6G
P(e)
P(f)
P(g)
7G
P(PM)
P(WED)
P(TUE)
P(MON)
7G
P(SUN)
P(AM)

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RESISTOR VALUES ARE IN OHMS, 1/6 W 5%.
2. CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.

Figure 6-62. Display Mother Board (DMB) Schematic

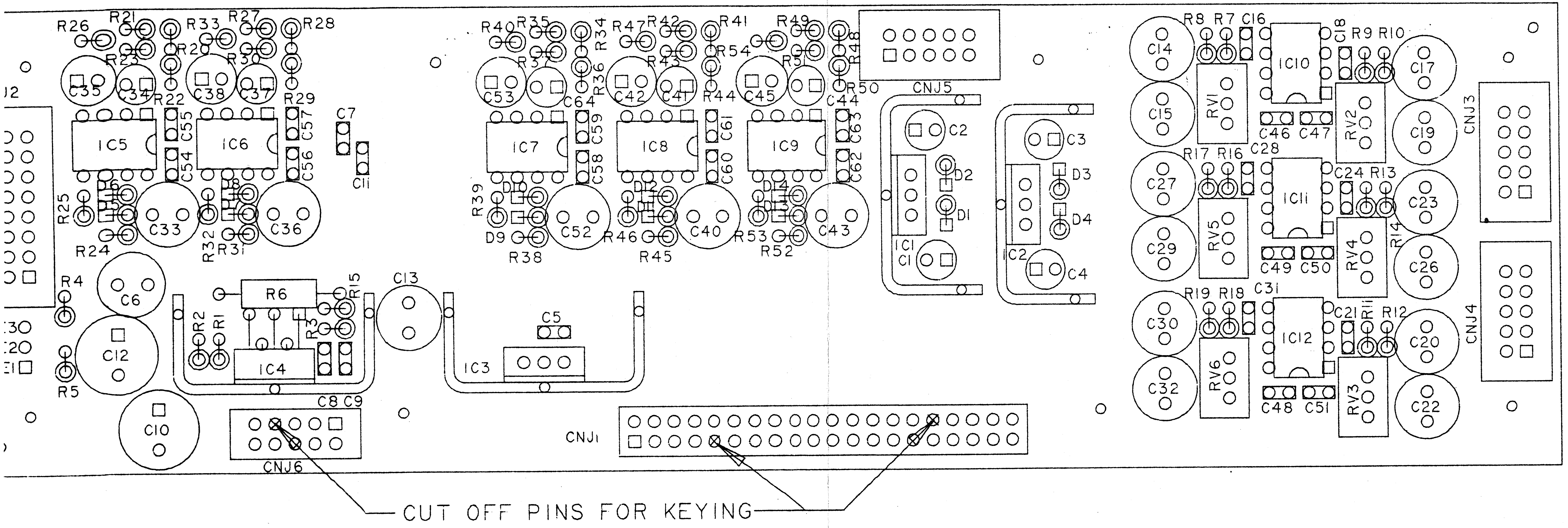
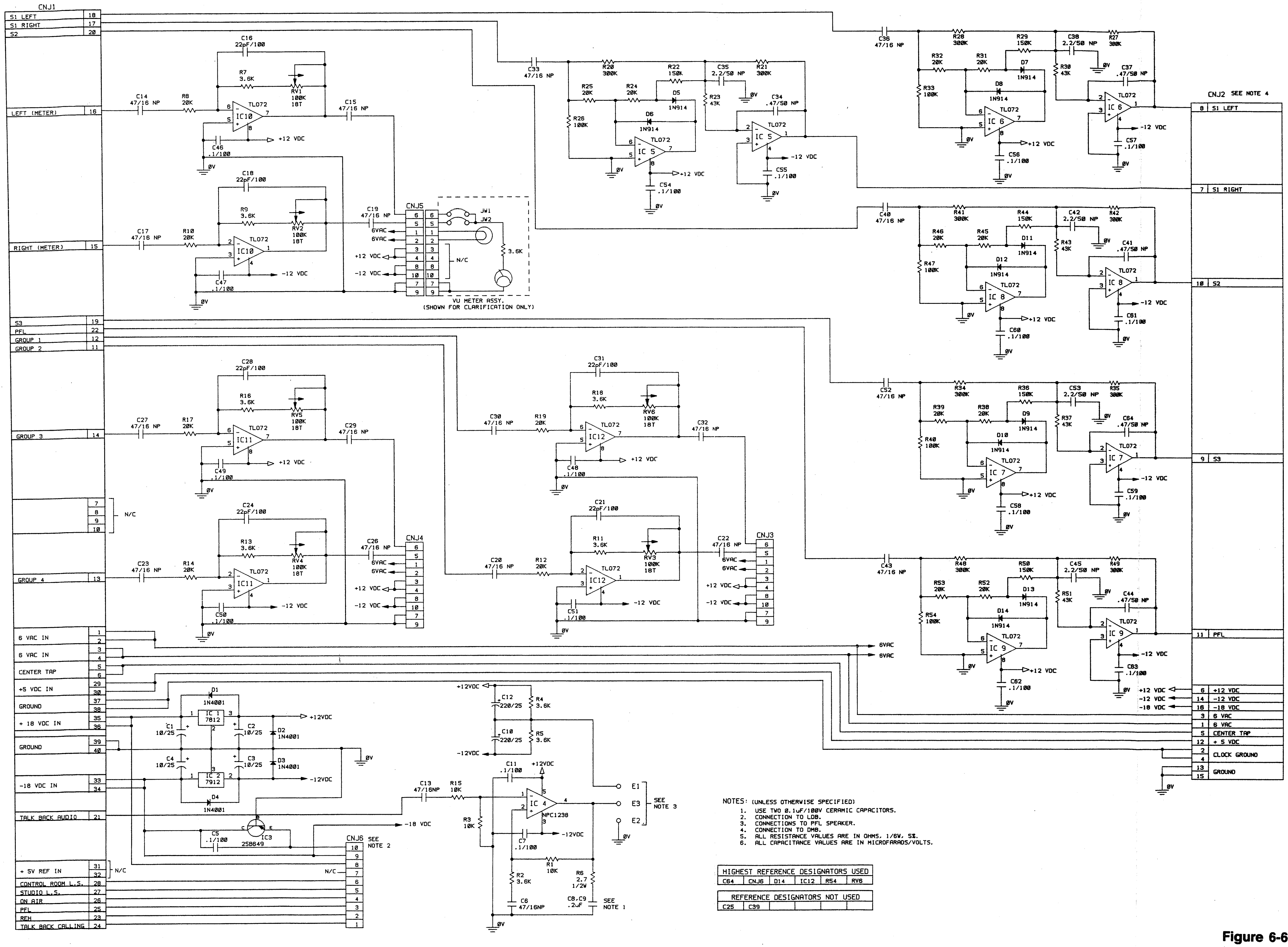

R26
R21
R33
R27
R28
R23
R20
R30
C35
C34
R22
C38
C37
R29
C55
C57
C7
C54
C56
C11
IC5
IC6
D6
D5
D8
D7
R25
C33
C36
R24
R32
R31
R4
C6
R6
R15
C13
R2
R1
R3
C12
IC4
C5
IC3
R5
C10
C8
C9
CNJ6
C30
C20
E1
J2
R40
R35
R34
R47
R42
R41
R49
R48
R37
R36
R43
R54
R51
C53
C64
C42
C41
R44
C45
C44
R50
C59
C61
C63
IC7
IC8
IC9
C58
C60
C62
R39
D10
D12
D14
D11
D13
C52
C40
C43
D9
R46
R53
R38
R45
R52
CNJ5
C2
C3
D2
D3
D1
D4
IC1
C1
IC2
C4
CNJ1
R8
R7
C16
C18
R9
R10
C14
IC10
C17
C15
RV1
RV2
C19
C46
C47
CNJ3
R17
R16
C28
C24
R13
C27
IC11
C23
C29
RV5
RV4
R14
C49
C50
C26
R19
R18
C31
C21
R11
R12
C30
IC12
C20
CNJ4
RV6
RV3
C32
C48
C51
C22
CUT OFF PINS FOR KEYING

**Figure 6-63. Panel Meter Board (PMB)
Mechanical Assembly**


CNJ1
S1 LEFT 18
S1 RIGHT 17
S2 20
LEFT (METER) 16
RIGHT (METER) 15
S3 19
PFL 22
GROUP 1 12
GROUP 2 11
GROUP 3 14
GROUP 4 13
N/C
6 VAC IN
CENTER TAP
+5 VDC IN
GROUND
+ 18 VDC IN
-18 VDC IN
TALK BACK AUDIO 21
+ 5V REF IN
CONTROL ROOM L.S. 28
STUDIO L.S. 27
ON AIR 26
PFL 25
REH 23
TALK BACK CALLING 24
C16 22pF/100
R7 3.6K
RV1 100K 18T
C14 47/16 NP
R8 20K
TL072
IC10
C15 47/16 NP
C46 .1/100
+12 VDC
-12 VDC
0V
C18 22pF/100
R9 3.6K
RV2 100K 18T
C17 47/16 NP
R10 20K
C47 .1/100
C19 47/16 NP
CNJ5
6VAC
JW1
JW2
3.6K
N/C
VU METER ASSY. (SHOWN FOR CLARIFICATION ONLY)
C33 47/16 NP
R20 300K
R22 150K
C35 2.2/50 NP
R21 300K
R25 20K
R24 20K
D5 1N914
D6 1N914
R23 43K
C34 .47/50 NP
R26 100K
IC 5
C54 .1/100
C55 .1/100
C36 47/16 NP
R28 300K
R29 150K
C38 2.2/50 NP
R27 300K
R32 20K
R31 20K
D7 1N914
D8 1N914
R30 43K
C37 .47/50 NP
R33 100K
IC 6
C56 .1/100
C57 .1/100
CNJ2 SEE NOTE 4
8 S1 LEFT
7 S1 RIGHT
10 S2
9 S3
11 PFL
C40 47/16 NP
R41 300K
R44 150K
C42 2.2/50 NP
R42 300K
R46 20K
R45 20K
D11 1N914
D12 1N914
R43 43K
C41 .47/50 NP
R47 100K
IC 8
C60 .1/100
C61 .1/100
C20 22pF/100
R16 3.6K
RV5 100K 18T
C27 47/16 NP
R17 20K
IC11
C29 47/16 NP
C49 .1/100
C24 22pF/100
R13 3.6K
RV4 100K 18T
C23 47/16 NP
R14 20K
C50 .1/100
C26 47/16 NP
CNJ4
C31 22pF/100
R18 3.6K
RV6 100K 18T
C30 47/16 NP
R19 20K
IC12
C32 47/16 NP
C48 .1/100
C21 22pF/100
R11 3.6K
RV3 100K 18T
C28 47/16 NP
R12 20K
C51 .1/100
C22 47/16 NP
CNJ3
C52 47/16 NP
R34 300K
R36 150K
C53 2.2/50 NP
R35 300K
R39 20K
R38 20K
D9 1N914
D10 1N914
R37 43K
C64 .47/50 NP
R40 100K
IC 7
C58 .1/100
C59 .1/100
C43 47/16 NP
R48 300K
R50 150K
C45 2.2/50 NP
R49 300K
R53 20K
R52 20K
D13 1N914
D14 1N914
R51 43K
C44 .47/50 NP
R54 100K
IC 9
C62 .1/100
C63 .1/100
6VAC
D1 1N4001
IC 1 7812
C1 10/25
C2 10/25
D2 1N4001
+12VDC
C4 10/25
IC 2 7912
C3 10/25
D3 1N4001
-12VDC
D4 1N4001
C5 .1/100
IC3 2SB649
-18 VDC
CNJ6 SEE NOTE 2
N/C
C12 220/25
R4 3.6K
C10 220/25
R5 3.6K
C11 .1/100
C13 47/16NP
R15 10K
R3 10K
IC 4 NPC1238
C7 .1/100
R1 10K
R6 2.7 1/2W
R2 3.6K
C6 47/16NP
C8,C9 .2uF SEE NOTE 1
E1
E3
E2
SEE NOTE 3
+12 VDC 6
-12 VDC 14
-18 VDC 16
6 VAC 3
6 VAC 1
CENTER TAP 5
+ 5 VDC 12
CLOCK GROUND 2 4
GROUND 13 15

NOTES: (UNLESS OTHERWISE SPECIFIED)
1. USE TWO 0.1uF/100V CERAMIC CAPACITORS.
2. CONNECTION TO LDB.
3. CONNECTIONS TO PFL SPEAKER.
4. CONNECTION TO DMB.
5. ALL RESISTANCE VALUES ARE IN OHMS, 1/6W, 5%.
6. ALL CAPACITANCE VALUES ARE IN MICROFARADS/VOLTS.

HIGHEST REFERENCE DESIGNATORS USED					
C64	CNJ6	D14	IC12	R54	RV6

REFERENCE DESIGNATORS NOT USED					
C25	C39				

Figure 6-64. Panel Meter Board (PMB) Schematic

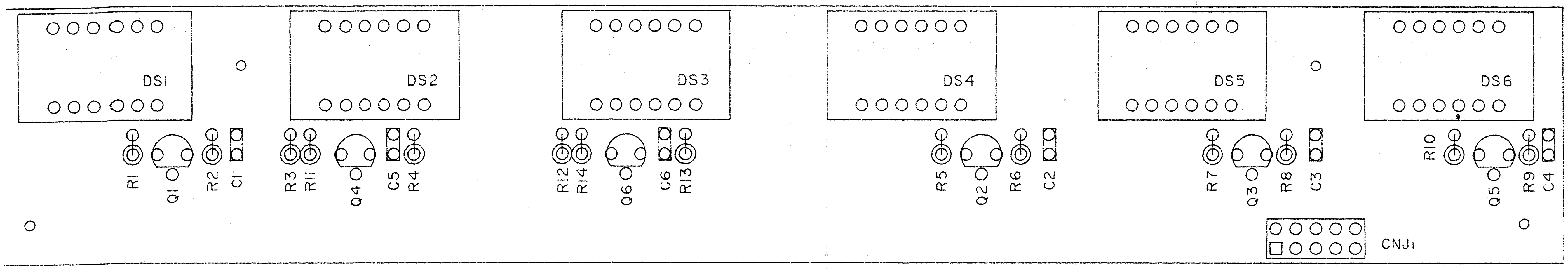

DS1
DS2
DS3
DS4
DS5
DS6
R1
Q1
R2
C1
R3
R11
Q4
C5
R4
R12
R14
Q6
C6
R13
R5
Q2
R6
C2
R7
Q3
R8
C3
R10
Q5
R9
C4
CNJ1

Figure 6-65. LED Display Board (LDB) Mechanical Assembly

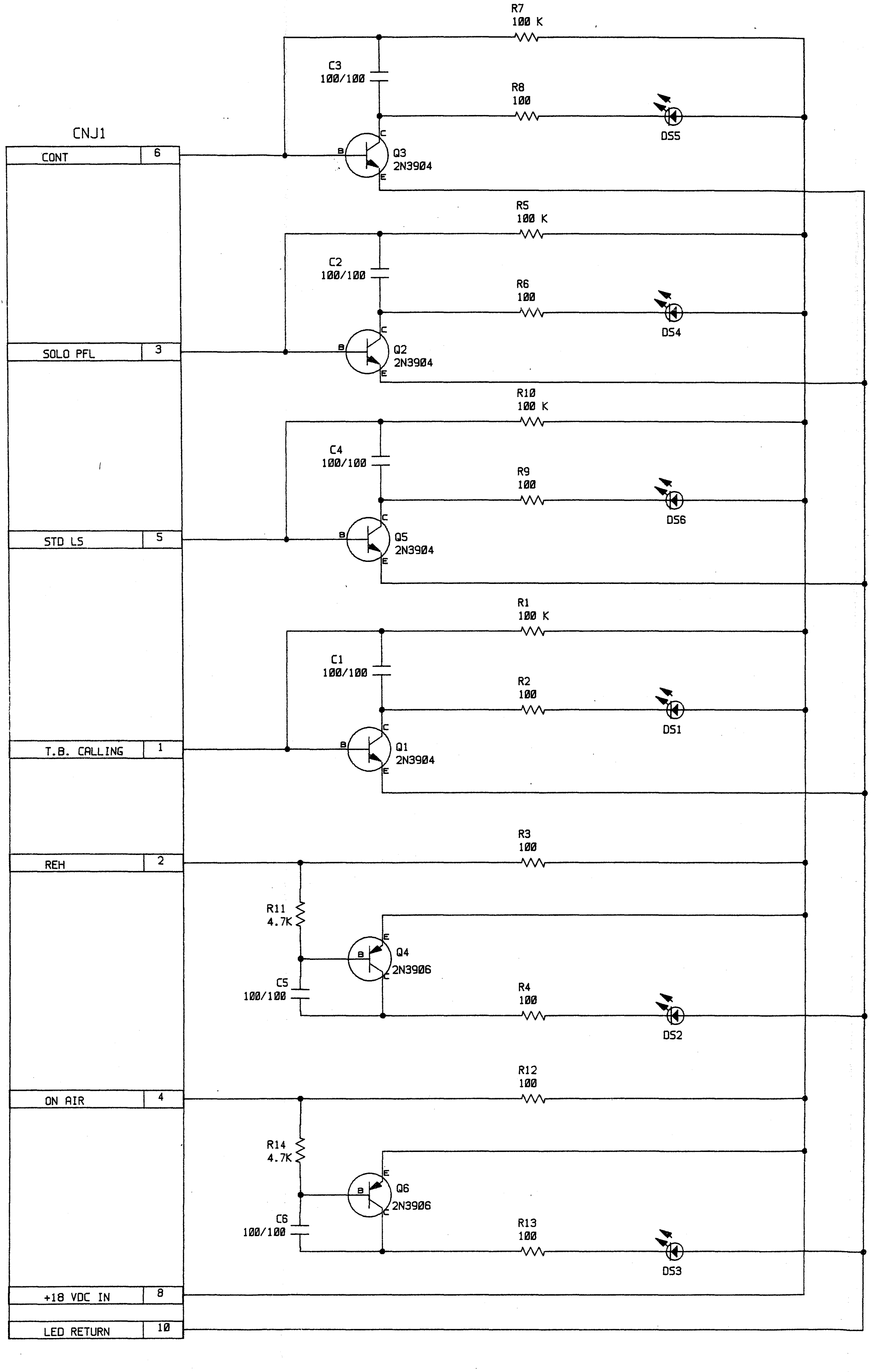

CNJ1
CONT 6
SOLO PFL 3
STD LS 5
T.B. CALLING 1
REH 2
ON AIR 4
+18 VDC IN 8
LED RETURN 10
R7
100 K
C3
100/100
R8
100
DS5
Q3
2N3904
R5
100 K
C2
100/100
R6
100
DS4
Q2
2N3904
R10
100 K
C4
100/100
R9
100
DS6
Q5
2N3904
R1
100 K
C1
100/100
R2
100
DS1
Q1
2N3904
R3
100
R11
4.7K
Q4
2N3906
C5
100/100
R4
100
DS2
R12
100
R14
4.7K
Q6
2N3906
C6
100/100
R13
100
DS3
B
C
E

Figure 6-66. LED Display Board (LDB) Schematic

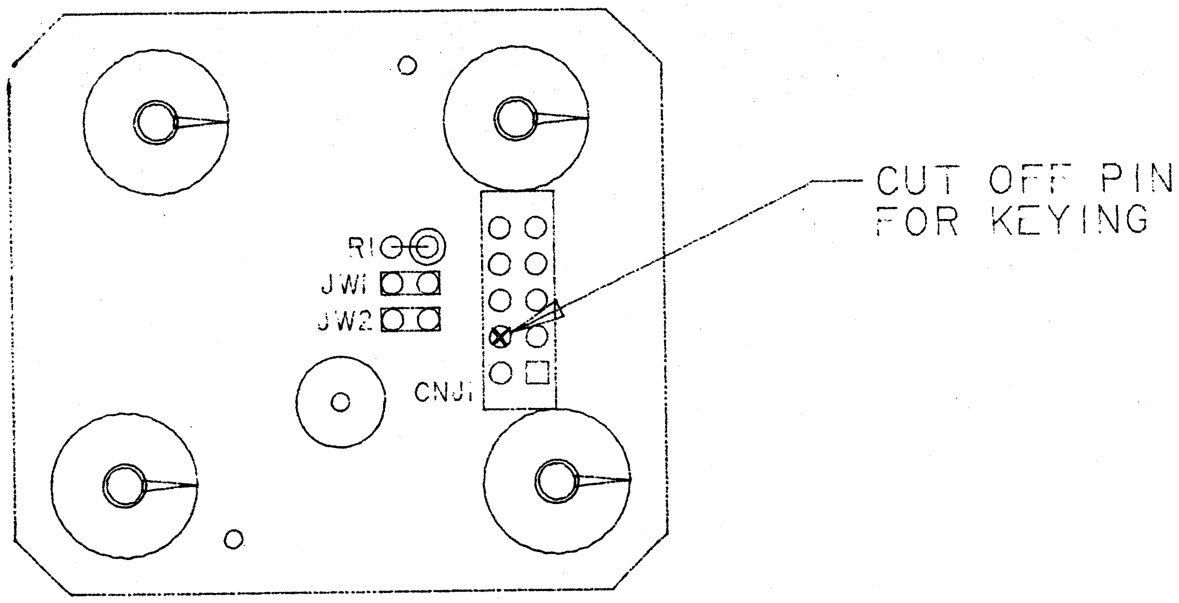

R1
JW1
JW2
CNJ1
CUT OFF PIN
FOR KEYING

Figure 6-67. Meter Input Board (MIB)
Mechanical Assembly

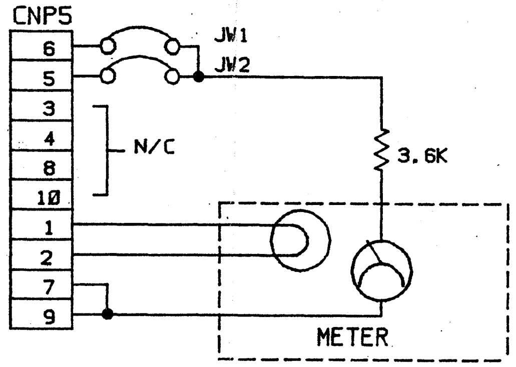

CNP5
6
5
3
4
8
10
1
2
7
9
N/C
JW1
JW2
3.6K
METER

Figure 6-68. Meter Input Board (MIB) Schematic

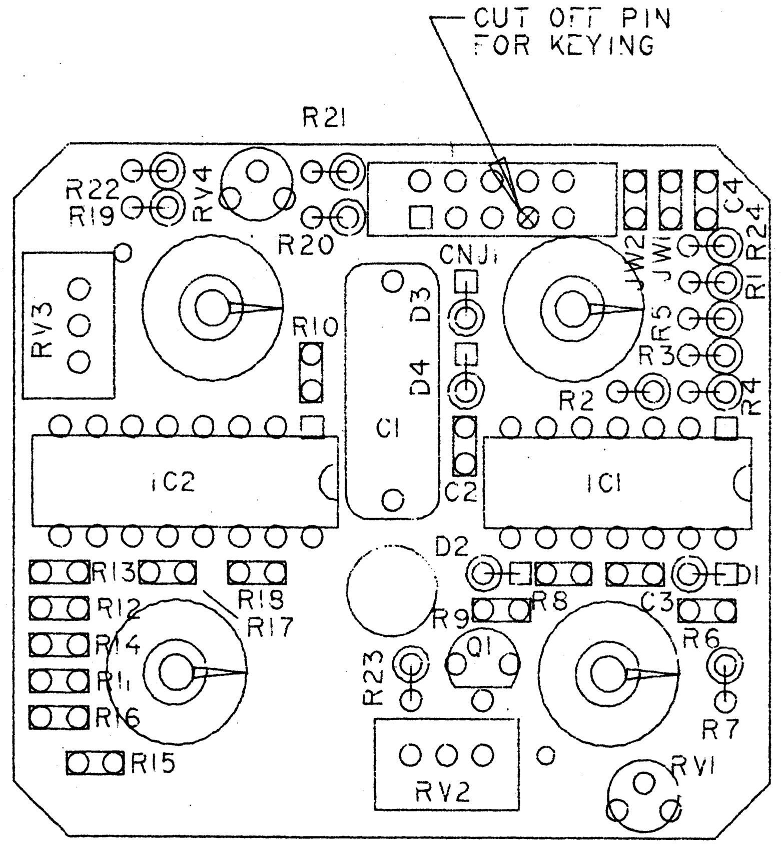
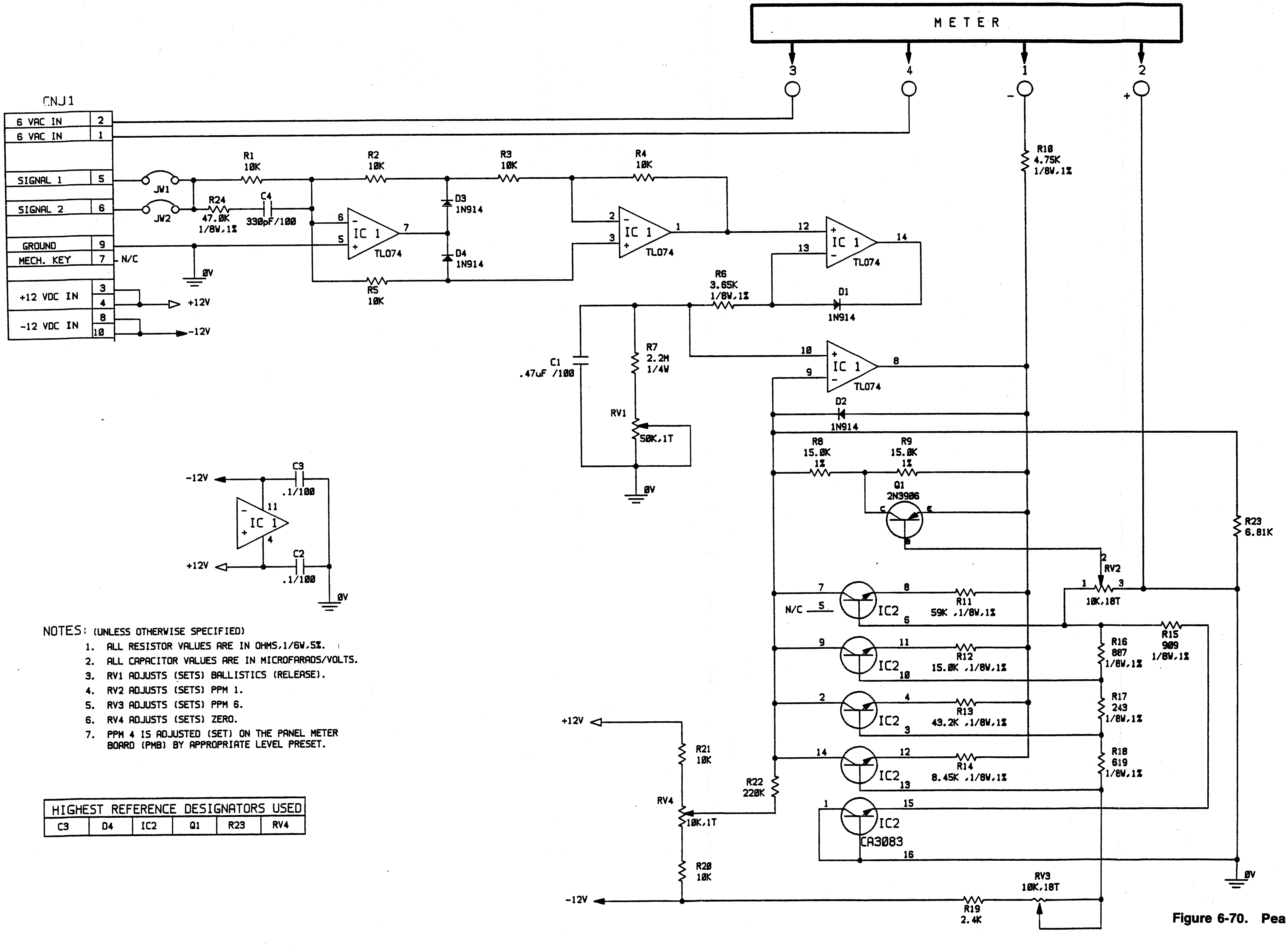

CUT OFF PIN FOR KEYING
R21
R22
R19
RV4
R20
CNJ1
C4
R24
R1
JW2
JW1
R5
R3
R4
R2
RV3
R10
D3
D4
C1
IC2
IC1
C2
D2
D1
R13
R12
R14
R11
R16
R15
R18
R17
R9
R8
C3
R6
R23
Q1
R7
RV2
RV1

Figure 6-69. Peak Program Meter Board (PPM) Mechanical Assembly


METER
3
4
1
2
-
+
CNJ1
6 VAC IN 2
6 VAC IN 1
SIGNAL 1 5
SIGNAL 2 6
GROUND 9
MECH. KEY 7
N/C
+12 VDC IN 3 4
-12 VDC IN 8 10
+12V
-12V
JW1
JW2
R1 10K
R2 10K
R3 10K
R4 10K
R5 10K
R24 47.0K 1/8W,1%
C4 330pF/100
0V
IC 1
TL074
6 5 7
2 3 1
12 13 14
10 9 8
D3 1N914
D4 1N914
D1 1N914
D2 1N914
R6 3.65K 1/8W,1%
R7 2.2M 1/4W
C1 .47uF /100
RV1 50K,1T
R10 4.75K 1/8W,1%
R8 15.0K 1%
R9 15.0K 1%
Q1 2N3906
C E B
RV2 10K,18T
1 2 3
R23 6.81K
IC2
CA3083
7 8 5 6 N/C
9 11 10
2 4 3
14 12 13
1 15 16
R11 59K ,1/8W,1%
R12 15.0K ,1/8W,1%
R13 43.2K ,1/8W,1%
R14 8.45K ,1/8W,1%
R15 909 1/8W,1%
R16 887 1/8W,1%
R17 243 1/8W,1%
R18 619 1/8W,1%
R19 2.4K
RV3 10K,18T
R21 10K
RV4 10K,1T
R20 10K
R22 220K
C3 .1/100
C2 .1/100
11 4

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTOR VALUES ARE IN OHMS,1/6W,5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.
3. RV1 ADJUSTS (SETS) BALLISTICS (RELEASE).
4. RV2 ADJUSTS (SETS) PPM 1.
5. RV3 ADJUSTS (SETS) PPM 6.
6. RV4 ADJUSTS (SETS) ZERO.
7. PPM 4 IS ADJUSTED (SET) ON THE PANEL METER BOARD (PMB) BY APPROPRIATE LEVEL PRESET.

HIGHEST REFERENCE DESIGNATORS USED					
C3	D4	IC2	Q1	R23	RV4

Figure 6-70. Peak Program Meter Board (PPM) Schematic

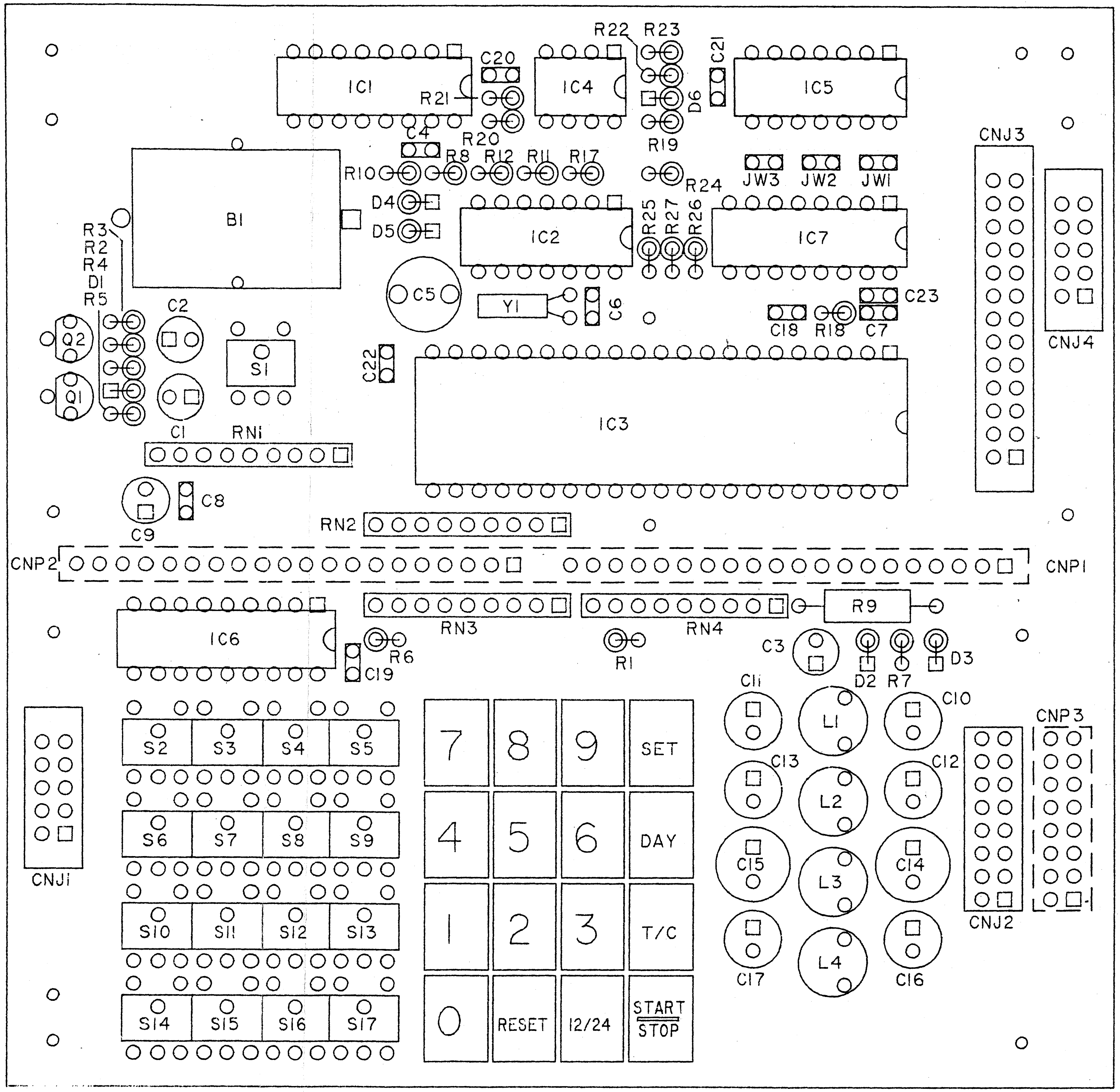

IC1
C20
IC4
R22
R23
C21
IC5
R21
D6
R20
C4
R19
R10
R8
R12
R11
R17
R24
JW3
JW2
JW1
CNJ3
B1
D4
D5
IC2
R25
R27
R26
IC7
R3
R2
R4
D1
R5
C5
Y1
C6
C23
C2
C18
R18
C7
CNJ4
Q2
S1
C22
Q1
IC3
C1
RN1
C8
C9
RN2
CNP2
CNP1
R9
RN3
RN4
IC6
R6
C3
D3
C19
R1
D2
R7
C11
C10
CNP3
L1
S2
S3
S4
S5
7
8
9
SET
C13
C12
L2
CNJ1
S6
S7
S8
S9
4
5
6
DAY
C15
C14
L3
CNJ2
S10
S11
S12
S13
1
2
3
T/C
C17
L4
C16
S14
S15
S16
S17
0
RESET
12/24
START
STOP

Figure 6-71. Clock Board (CLK) Mechanical Assembly

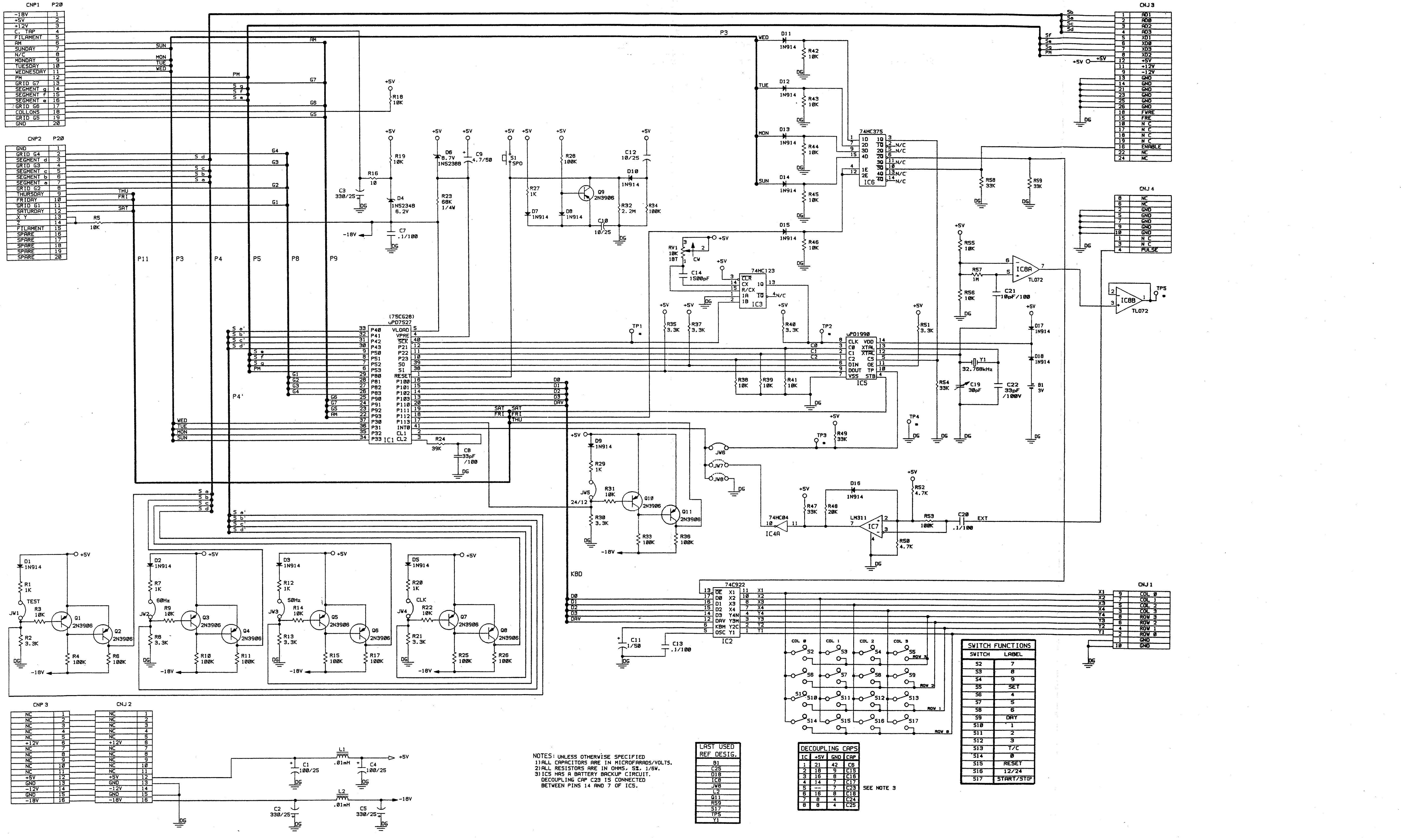

CNP1
P20
CNP2
CNP3
CNJ 1
CNJ 2
CNJ 3
CNJ 4
-18V
+5V
+12V
C. TAP
FILAMENT
AM
SUNDAY
N/C
MONDAY
TUESDAY
WEDNESDAY
PM
GRID G7
SEGMENT g
SEGMENT f
SEGMENT e
GRID G6
COLLONS
GRID G5
GND
GRID G4
SEGMENT d
GRID G3
SEGMENT c
SEGMENT b
SEGMENT a
GRID G2
THURSDAY
FRIDAY
GRID G1
SATURDAY
X Y
Z
SPARE
P3
P4
P5
P8
P9
P11
P4'
(75CG20)
uPD7527
IC1
uPD1990
IC5
74HC375
IC6
74HC123
IC3
74C922
IC2
74HC04
IC4A
LM311
IC7
TL072
IC8A
IC8B
Y1
32.768kHz
B1
3V
S1
SPD
RV1
10K
18T
CW
TP1
TP2
TP3
TP4
TP5
JW1
JW2
JW3
JW4
JW5
JW6
JW7
JW8
24/12
TEST
60Hz
50Hz
CLK
KBD
EXT
PULSE
ENABLE
FWRE
FRE
AD0
AD1
AD2
AD3
XD0
XD1
XD2
XD3
COL 0
COL 1
COL 2
COL 3
ROW 0
ROW 1
ROW 2
ROW 3
L1
L2
.01mH
2N3906
1N914
1N5230B
1N5234B
DG

Figure 6-72. Clock Board (CLK) Schematic

NOTES: UNLESS OTHERWISE SPECIFIED
1) ALL CAPACITORS ARE IN MICROFARADS/VOLTS.
2) ALL RESISTORS ARE IN OHMS, 5%, 1/6W.
3) IC5 HAS A BATTERY BACKUP CIRCUIT.
DECOUPLING CAP C23 IS CONNECTED
BETWEEN PINS 14 AND 7 OF IC5.

LAST USED REF DESIG.
B1
C25
D18
IC8
JW8
L2
Q11
R59
S17
TP5
Y1

DECOUPLING CAPS

IC	+5V	GND	CAP
1	21	42	C6
2	18	9	C15
3	16	8	C16
4	14	7	C17
5	--	7	C23
6	16	8	C18
7	8	4	C24
8	8	4	C25

SEE NOTE 3

SWITCH FUNCTIONS

SWITCH	LABEL
S2	7
S3	8
S4	9
S5	SET
S6	4
S7	5
S8	6
S9	DAY
S10	1
S11	2
S12	3
S13	T/C
S14	0
S15	RESET
S16	12/24
S17	START/STOP

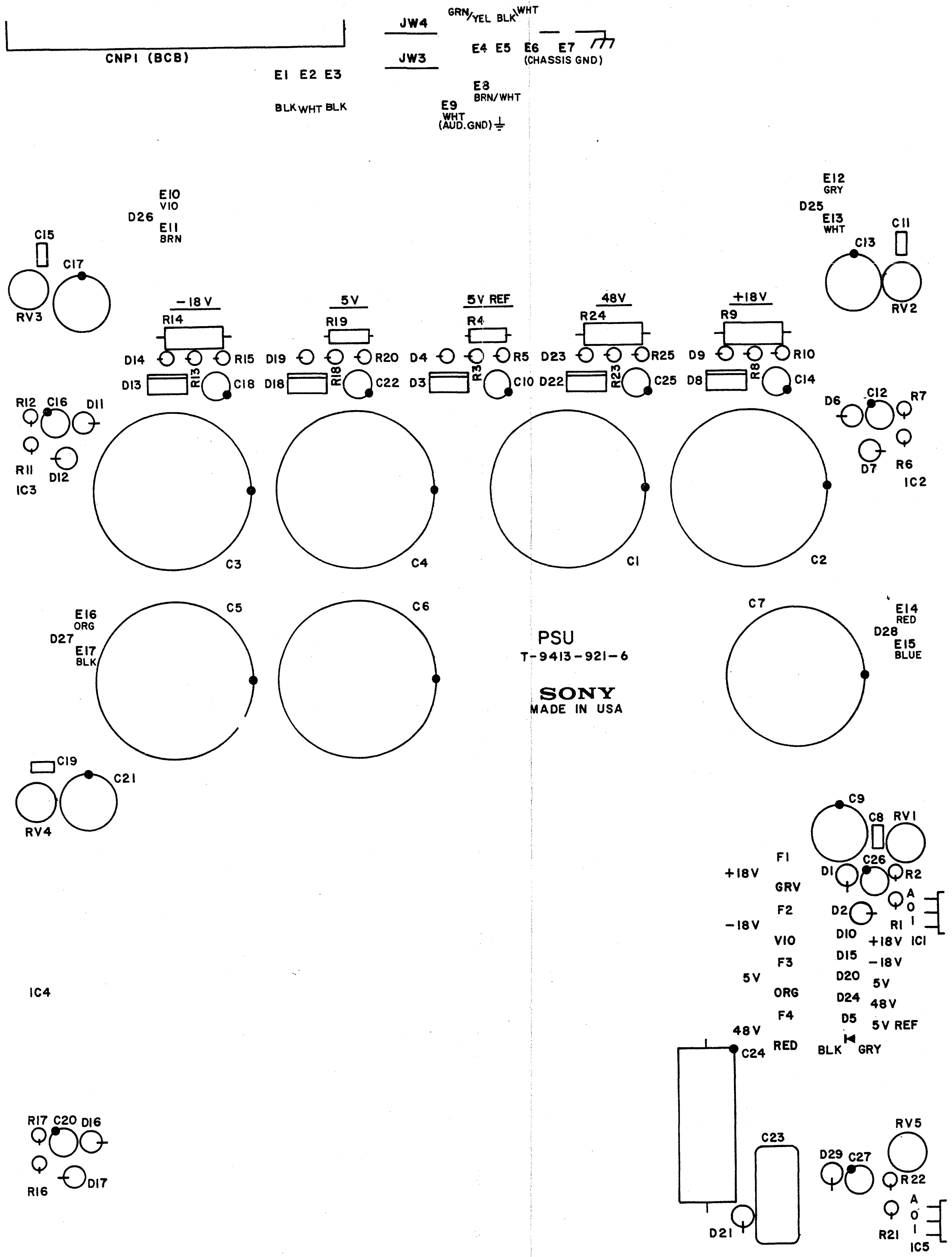
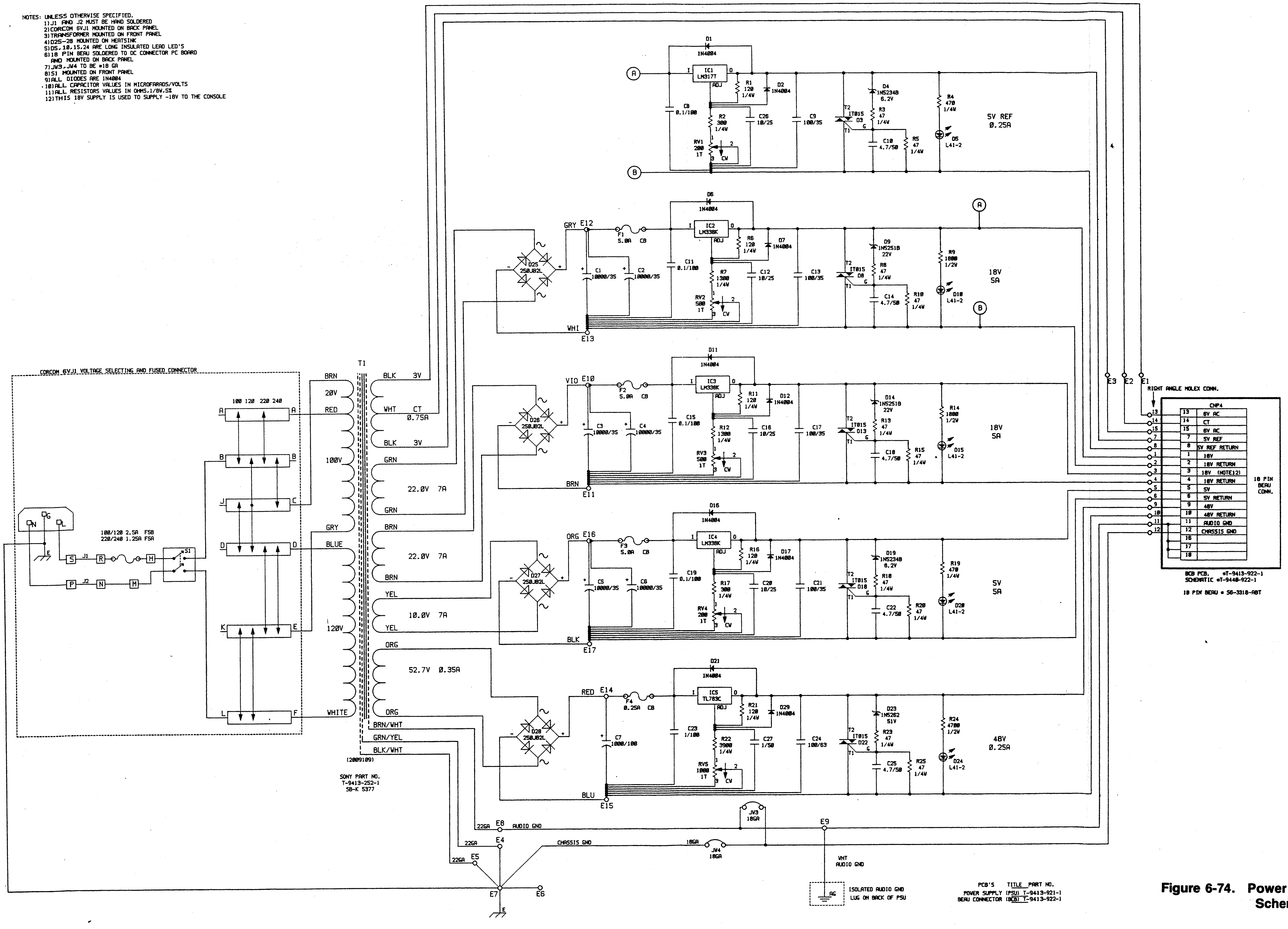

CNP1 (BCB)
E1 E2 E3
BLK WHT BLK
JW4
JW3
GRN/YEL BLK WHT
E4 E5 E6 E7
(CHASSIS GND)
E8
BRN/WHT
E9
WHT
(AUD.GND)
E10
VIO
D26
E11
BRN
C15
C17
RV3
E12
GRY
D25
E13
WHT
C13
C11
RV2
−18 V
R14
5V
R19
5V REF
R4
48V
R24
+18V
R9
D14
R15
D19
R20
D4
R5
D23
R25
D9
R10
D13
R13
C18
D18
R18
C22
D3
R3
C10
D22
R23
C25
D8
R8
C14
R12
C16
D11
R11
D12
IC3
D6
C12
R7
D7
R6
IC2
C3
C4
C1
C2
E16
ORG
D27
E17
BLK
C5
C6
PSU
T-9413-921-6
SONY
MADE IN USA
C7
E14
RED
D28
E15
BLUE
C19
C21
RV4
C9
C8
RV1
F1
+18V
GRV
C26
D1
R2
F2
−18V
D2
A
O
I
R1
VIO
D10
+18V
IC1
F3
D15
−18V
5V
D20
5V
ORG
D24
48V
F4
D5
48V
5V REF
RED
BLK
GRY
C24
IC4
R17
C20
D16
R16
D17
C23
RV5
D29
C27
R22
A
O
I
R21
IC5
D21

Figure 6-73. Power Supply Board (PSU) Mechanical Assembly

NOTES: UNLESS OTHERWISE SPECIFIED.
1) J1 AND J2 MUST BE HAND SOLDERED
2) CORCOM 6VJ1 MOUNTED ON BACK PANEL
3) TRANSFORMER MOUNTED ON FRONT PANEL
4) D25-28 MOUNTED ON HEATSINK
5) D5, 10, 15, 24 ARE LONG INSULATED LEAD LED'S
6) 18 PIN BEAU SOLDERED TO DC CONNECTOR PC BOARD
AND MOUNTED ON BACK PANEL
7) JW3, JW4 TO BE *18 GA
8) S1 MOUNTED ON FRONT PANEL
9) ALL DIODES ARE 1N4004
10) ALL CAPACITOR VALUES IN MICROFARADS/VOLTS
11) ALL RESISTORS VALUES IN OHMS, 1/8W, 5%
12) THIS 18V SUPPLY IS USED TO SUPPLY -18V TO THE CONSOLE


CORCOM 6VJ1 VOLTAGE SELECTING AND FUSED CONNECTOR
N
G
L
E
S
J1
R
H
P
J2
N
M
S1
100/120 2.5A F5B
220/240 1.25A F5A
100 120 220 240
A
B
J
C
D
K
E
L
F
T1
BRN
20V
RED
100V
GRY
BLUE
120V
WHITE
BLK 3V
WHT CT 0.75A
BLK 3V
GRN
22.0V 7A
GRN
BRN
22.0V 7A
BRN
YEL
10.0V 7A
YEL
ORG
52.7V 0.35A
ORG
BRN/WHT
GRN/YEL
BLK/WHT
(2009109)
SONY PART NO.
T-9413-252-1
58-K 5377
D1 1N4004
IC1 LM317T
ADJ
R1 120 1/4W
D2 1N4004
C8 0.1/100
R2 300 1/4W
C26 10/25
RV1 200 1T
CV
C9 100/35
T2 IT015 D3
D4 1N5234B 6.2V
R3 47 1/4W
C10 4.7/50
R5 47 1/4W
R4 470 1/4W
D5 L41-2
5V REF 0.25A
GRY E12
F1 5.0A CB
D25 2S0JB2L
C1 10000/35
C2 10000/35
D6 1N4004
IC2 LM338K
R6 120 1/4W
D7 1N4004
C11 0.1/100
R7 1300 1/4W
C12 10/25
RV2 500 1T
C13 100/35
T2 IT015 D8
D9 1N5251B 22V
R8 47 1/4W
C14 4.7/50
R10 47 1/4W
R9 1000 1/2W
D10 L41-2
18V 5A
WHI E13
VIO E10
F2 5.0A CB
D26 2S0JB2L
C3 10000/35
C4 10000/35
D11 1N4004
IC3 LM338K
R11 120 1/4W
D12 1N4004
C15 0.1/100
R12 1300 1/4W
C16 10/25
RV3 500 1T
C17 100/35
T2 IT015 D13
D14 1N5251B 22V
R13 47 1/4W
C18 4.7/50
R15 47 1/4W
R14 1000 1/2W
D15 L41-2
18V 5A
BRN E11
ORG E16
F3 5.0A CB
D27 2S0JB2L
C5 10000/35
C6 10000/35
D16 1N4004
IC4 LM338K
R16 120 1/4W
D17 1N4004
C19 0.1/100
R17 300 1/4W
C20 10/25
RV4 200 1T
C21 100/35
T2 IT015 D18
D19 1N5234B 6.2V
R18 47 1/4W
C22 4.7/50
R20 47 1/4W
R19 470 1/4W
D20 L41-2
5V 5A
BLK E17
RED E14
F4 0.25A CB
D28 2S0JB2L
C7 1000/100
D21 1N4004
IC5 TL783C
R21 120 1/4W
D29 1N4004
C23 1/100
R22 3900 1/4W
C27 1/50
RV5 1000 1T
C24 100/63
T2 IT015 D22
D23 1N5262 51V
R23 47 1/4W
C25 4.7/50
R25 47 1/4W
R24 4700 1/2W
D24 L41-2
48V 0.25A
BLU E15
JW3 18GA
JW4 18GA
22GA E8 AUDIO GND
22GA E4 CHASSIS GND
22GA E5
E7
E6
E9
WHT AUDIO GND
AG
ISOLATED AUDIO GND LUG ON BACK OF PSU
E3
E2
E1
RIGHT ANGLE MOLEX CONN.
CNP4
13 6V AC
14 CT
15 6V AC
7 5V REF
8 5V REF RETURN
1 18V
2 18V RETURN
3 18V (NOTE12)
4 18V RETURN
5 5V
6 5V RETURN
9 48V
10 48V RETURN
11 AUDIO GND
12 CHASSIS GND
16
17
18
18 PIN BEAU CONN.
BCB PCB. *T-9413-922-1
SCHEMATIC *T-9440-922-1
18 PIN BEAU * 56-3318-ABT

PCB'S	TITLE	PART NO.
POWER SUPPLY	(PSU)	T-9413-921-1
BEAU CONNECTOR	(BCB)	T-9413-922-1

Figure 6-74. Power Supply Board (PSU) Schematic

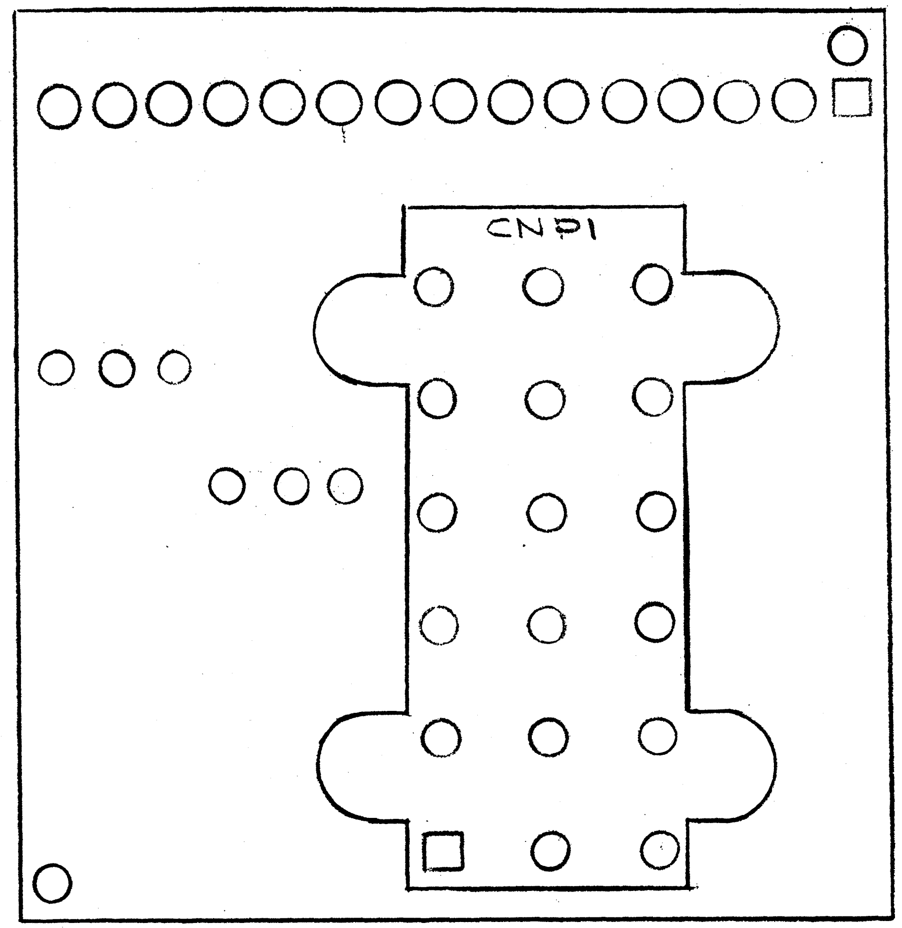
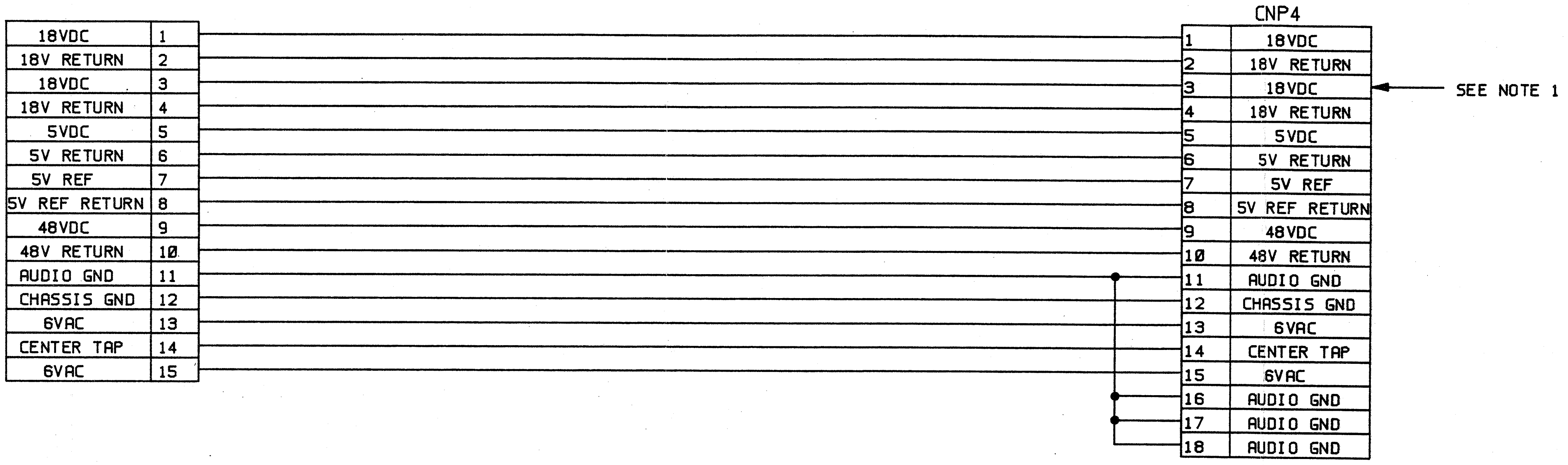


Figure 6-75. Beau Connector Board (BCB) Mechanical Assembly


CNP4
18VDC 1
18V RETURN 2
18VDC 3
18V RETURN 4
5VDC 5
5V RETURN 6
5V REF 7
5V REF RETURN 8
48VDC 9
48V RETURN 10
AUDIO GND 11
CHASSIS GND 12
6VAC 13
CENTER TAP 14
6VAC 15
1 18VDC
2 18V RETURN
3 18VDC
4 18V RETURN
5 5VDC
6 5V RETURN
7 5V REF
8 5V REF RETURN
9 48VDC
10 48V RETURN
11 AUDIO GND
12 CHASSIS GND
13 6VAC
14 CENTER TAP
15 6VAC
16 AUDIO GND
17 AUDIO GND
18 AUDIO GND
SEE NOTE 1

NOTES:
1. THIS 18V SUPPLY IS USED TO SUPPLY
-18V TO CONSOLE.

Figure 6-76. **Beau Connector Board (BCB) Schematic**

APPENDIX A
ACRONYMS AND ABBREVIATIONS

The following is a list of the acronyms and abbreviations used in this manual and on the equipment control panels. The list presents only the full name for each acronym or abbreviation. Those items requiring further definition are listed in Appendix B.

A	Ampere
AC	Alternating Current
ACN	Active Combining Network
AUX	Auxiliary
BTU	British Thermal Unit
CHAN	Channel
COM	Common Switch or Relay Contact
COMM	Communication(s)
dB	Decibel
DC	Direct Current
EQ	Equalizer
EQL	Left Channel Equalizer
EQR	Right Channel Equalizer
FREQ	Frequency
HP	Headphones
Hz	Hertz
I/O	Input/Output
IP	Input
k	Kilo (× 1000)
LS	Loudspeaker
LED	Light Emitting Diode
L	Left
LVL	Level
M	Mega (× 1000000)
m	Milli (× 0.001)
mA	Milliampere (0.001 A)
mV	Millivolt (0.001 V)
max	Maximum
MIC	Microphone
min	Minimum
MON	Monitor
N.C.	Not Connected
N/C	Normally Closed Contacts
N/O	Normally Open Contacts
OSC	Oscillator
PFL	Pre-Fader Listening
PHAN	Phantom Power
PPM	Peak Program Meter
R	Right
RET	Return
REV	Reverse
RLY	Relay
TB	Talkback
V	Volts
VCA	Voltage-Controlled Amplifier
VU	Volume Unit

APPENDIX B
GLOSSARY OF TERMS

ACN	Active Combining network. This summing amplifier is used to combine multiple inputs into a single composite signal.
AUX MIX	Auxiliary Mix — see Send
Buffer	An intermediate stage between a signal source and its destination. The buffer presents a constant load to the source and reduces the source impedance to the following stage.
Bus	A single conductor which carries multiple, combined signals.
Chamber	An echo device, external to the console, which may be patched into the console signal paths as required.
Channel	A group of circuits and controls used to handle an individual audio signal.
Comm Module	Communications module. This module provides communication facilities between the console and the studio and/or other destinations selected by the operator.
Cue	The headphone source. Sometimes called Foldback.
Decibel	A logarithmic ratio used to express a power level in relation to some given reference.
Effects Unit	A device, external to the console, which can be patched into the signal path to modify the sound of the final mix.
Equalizer	A circuit used to emphasize or suppress selected frequencies within the audio signal so as to improve the sound of the final Mix.
Fader	A gain or volume control.
High Pass Filter	An audio filter used to attenuate unwanted low frequency components of the audio signal.
Hertz	The unit of frequency measurement (1 Hz = 1 cycle per second).
I/O Module	Input/Output module. This module contains all of the circuits and controls used in processing a single input to the console.
Master Module	This module contains the master summing ampliers for the final Mix, together with all of the Return controls.
Mix A	The main console output. It is derived by combining all of the desired channel signals.
Mix B	The audio components of this Mix are identical to those in Mix A, but its level can be separately controlled.
Monitor Module	The module containing all of the circuits and controls used for Studio and Control Room monitoring.
Mono Mix	The signal derived by combining the left and right components of a stereo signal.
Pan	Panning is the process used to shift the apparent position of a sound source.
Reverse Talkback	A communications mode which allows the studio, or other designated sources, to talk directly to the console operator.
Send	Sends are auxiliary outputs from the console. These are generally used to provide cue signals or to feed external effects units.
Solo	A mode of operation in which the signals from only selected channels are fed to the control room speakers.
Talkback	A communications mode which allows the console operator to talk directly to the studio.
VCA	Voltage-Controlled Amplifier. An amplifier whose gain is controlled by varying the DC voltage applied to one of its terminals.

APPENDIX C
SYSTEM GROUNDING

AC LINE REQUIREMENTS

The AC Line

All hum and buzz, and many of the rf problems encountered in a studio installation, start with improper AC connections and grounding. The AC power wiring, light fixtures and power cords, together with virtually every other piece of equipment connected to the AC line, are surrounded by electromagnetic and electrostatic fields which can be picked up by every audio wire and circuit in the studio. In addition, the AC mains are carriers of the many forms of RFI (Radio Frequency Interference) generated by electric motors, SCR dimmers, medical equipment, computers, and other appliances. In order to minimize the effects of these potential noise sources, careful design of the electrical work in the studio is absolutely imperative.

The first, and most essential, step towards a proper AC power installation lies in isolating the studio from the power company lines and all general purpose wiring in the building. The simplest way to accomplish this is to have the power company install a separate power transformer and service entrance. Most smaller studios should have no problem in this, but, in some areas or in large buildings, it may not be possible.

If the power company cannot provide a separate power entry, an isolation transformer must be installed. The isolation transformer should be equipped with a Faraday shield connected to the ground side of the secondary winding.

Power Line Configurations

Power lines are available in many different configurations, the three most commonly used being single-phase, two-phase and three-phase. These three formats are illustrated in Figure 1. The most usual entrance format is the 240 VAC, two-phase arrangement, but the three-phase circuit is quite usual in larger buildings. Connection to three-phase systems should be avoided, since they are generally used for air conditioners and other heavy power equipment, and are subject to excessive line noise.

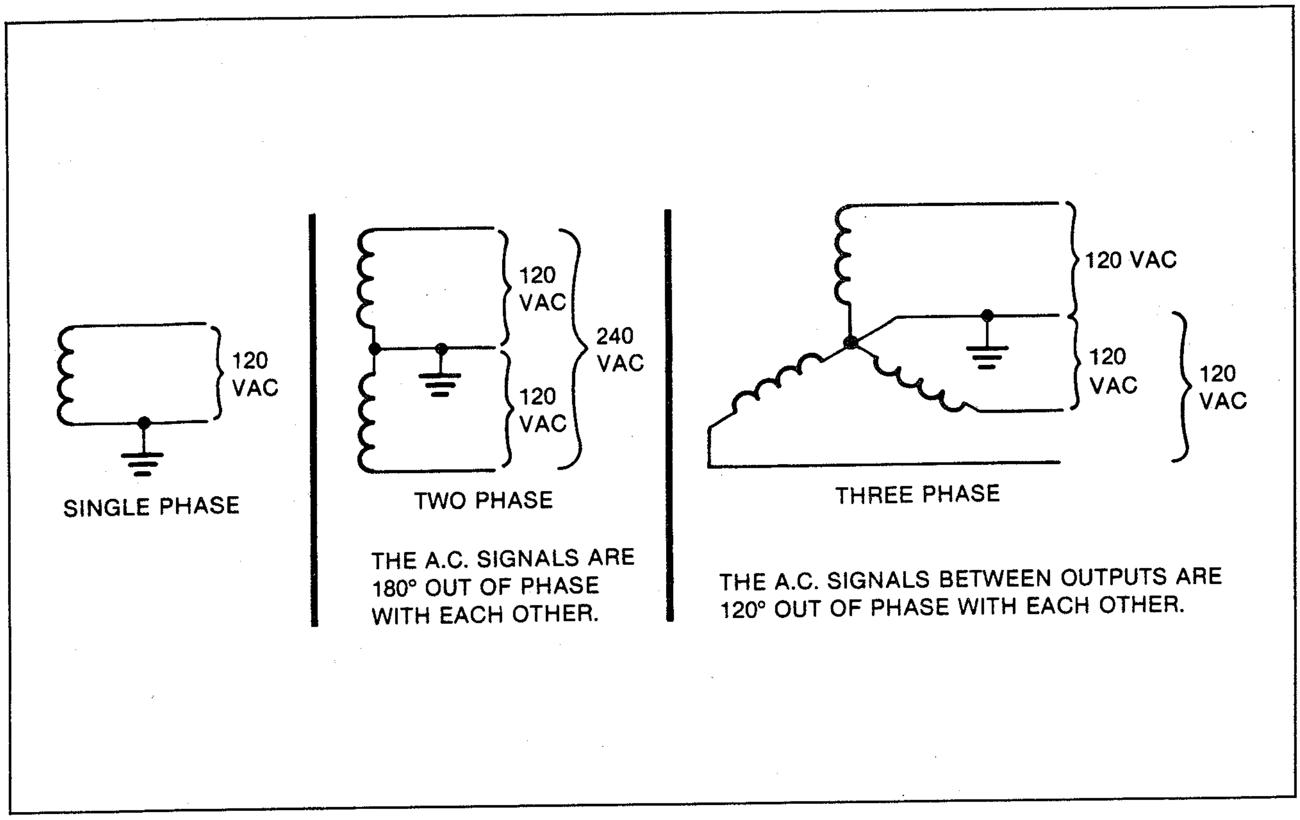


Figure 1. Power Line Systems

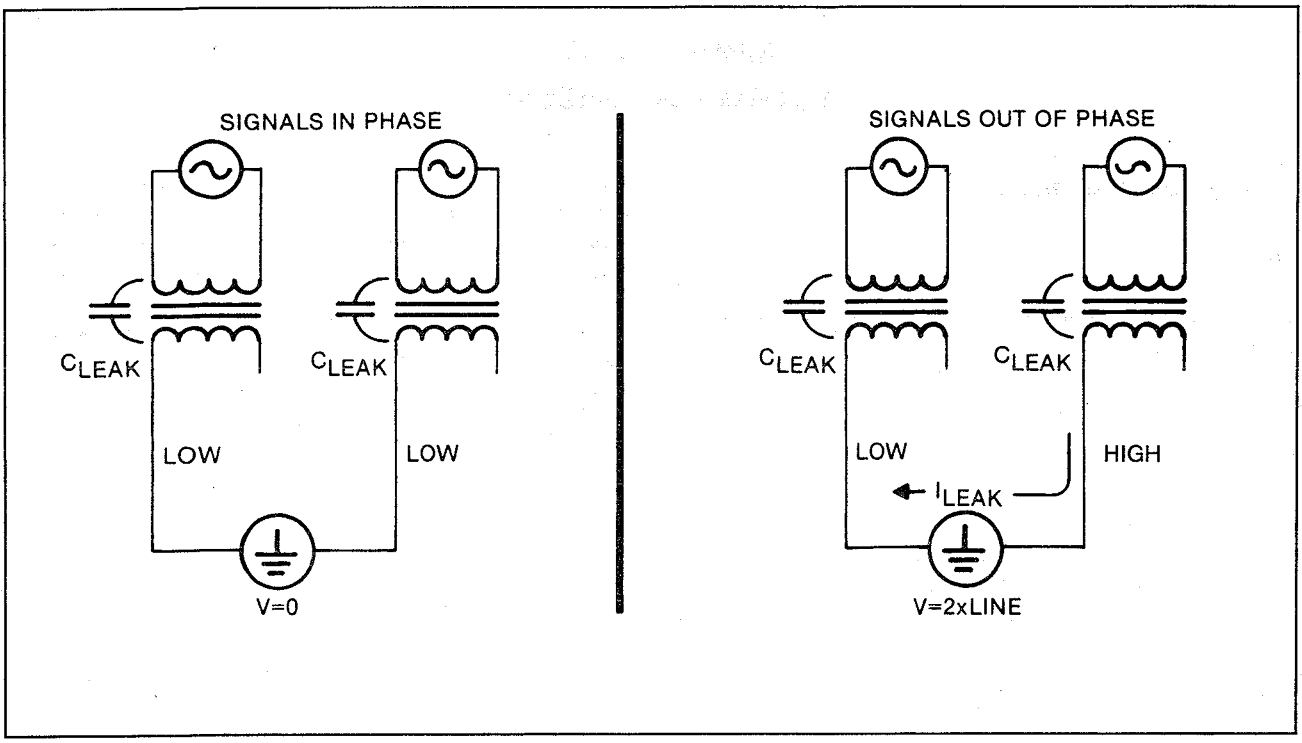


Figure 2. Leakage Current

Leakage Currents

A piece of electronic equipment that uses a power transformer always has some degree of capacitive coupling between its case and the AC line, and, if it is connected to some other piece of equipment which is powered from a different line phase, a leakage current flows in the common ground connection. A typical example of this type of leakage can be observed in the situation where reversing the power plug reduces hum in a home stereo system. (See Figure 2.)

To prevent this kind of leakage, all of the control room outlets should be wired to the same AC line phase. The best way to ensure this is to use an isolation transformer with a single-phase output.

General Wiring Considerations

When wiring the studio, the following general rules should be observed:

1. Do not connect anything other than audio equipment to the studio main power. NEVER power fluorescent lights, refreshment machines, SCR dimmers, fans, etc. from the studio line. Any requirement for these items should be met from a separate circuit on a different service entrance or, as an absolute minimum, from a different phase of the control room mains.
2. All AC power lines must be shielded in conduit, and physically isolated from the audio wiring.
3. The master power panel and the entrance power conduit should be located at least 30 feet away from the console and other audio equipment, particularly tape machines.
4. AC wiring or conduit must never be run in the same trough as audio wiring. Power lines radiate electromagnetic fields which can be picked up by adjacent audio conductors.

GROUNDING

Earth and Ground

"Earth" is the term used to describe the power company ground. The heavy ground wire brought into the breaker box ground plate is earth, and this should be the only grounding connection to the world outside the studio. Very frequently, a ground rod or water pipe ground is tied to this same point, and, in most communities, the water pipe ground is a legal requirement.

Ground is a relative term, and is the name given to the zero signal reference point in the studio. It is a true zero signal reference only if every piece of equipment in the studio is tied to this common point. There can be one, and only one, ground point in the entire studio complex, and it is to this point that all third-pin grounds, case grounds, etc. should be tied, rather like the spokes on a bicycle wheel. This zero reference should be tied to earth through one single conductor. (See Figure 3.)

The best point in the control room to use as the zero reference point is a ground lug or plate on the mixing console, and all Sony mixing consoles are provided with such ground plates. As a "second-best" alternative, the breaker box ground plate can be used, with a single, heavy conductor between the box and the console. While this system usually is much easier to instal, it will NOT be as good as having all grounds at the point where signal amplification occurs, i.e. the console.

Any potential difference between the amplifier's zero reference and ground becomes amplified and generates noise. For example, a conductor having 0.01 ohms of resistance and carrying a current of 1.0 mA has a voltage of 10 microvolts generated along its length. This represents a noise signal that is 100 dB below line level, and if this signal is applied to eight microphone preamplifiers, each having 40 dB of gain, the total gain of 58 dB results in an amplified noise signal of −42 dBv. This noise level is 23 dB above tape noise.

Connector Grounds

A separate ground wire must always be used for the third pin ground. Many studio installations have the third pins removed from all of the power cords. This practice is not only unnecessary, it is extremely hazardous. The problems encountered with ground loops caused by third pins are easily avoided by simply running a separate, insulated #14 ground wire to the third pin connection on each receptacle. To be able to accomplish this, all receptacles should have isolated third pins, and such types as the Hubble IG5362 or General Electric GE8300-IG are recommended.

Where Waverly strips are used in the installation, the case grounding prong on the back of each socket must be clipped off, and the third (green) wire connected to system ground. The metal case should be tied to conduit.

Third pins should never be allowed to short to conduit. Conduit grounds are totally unsuited for audio

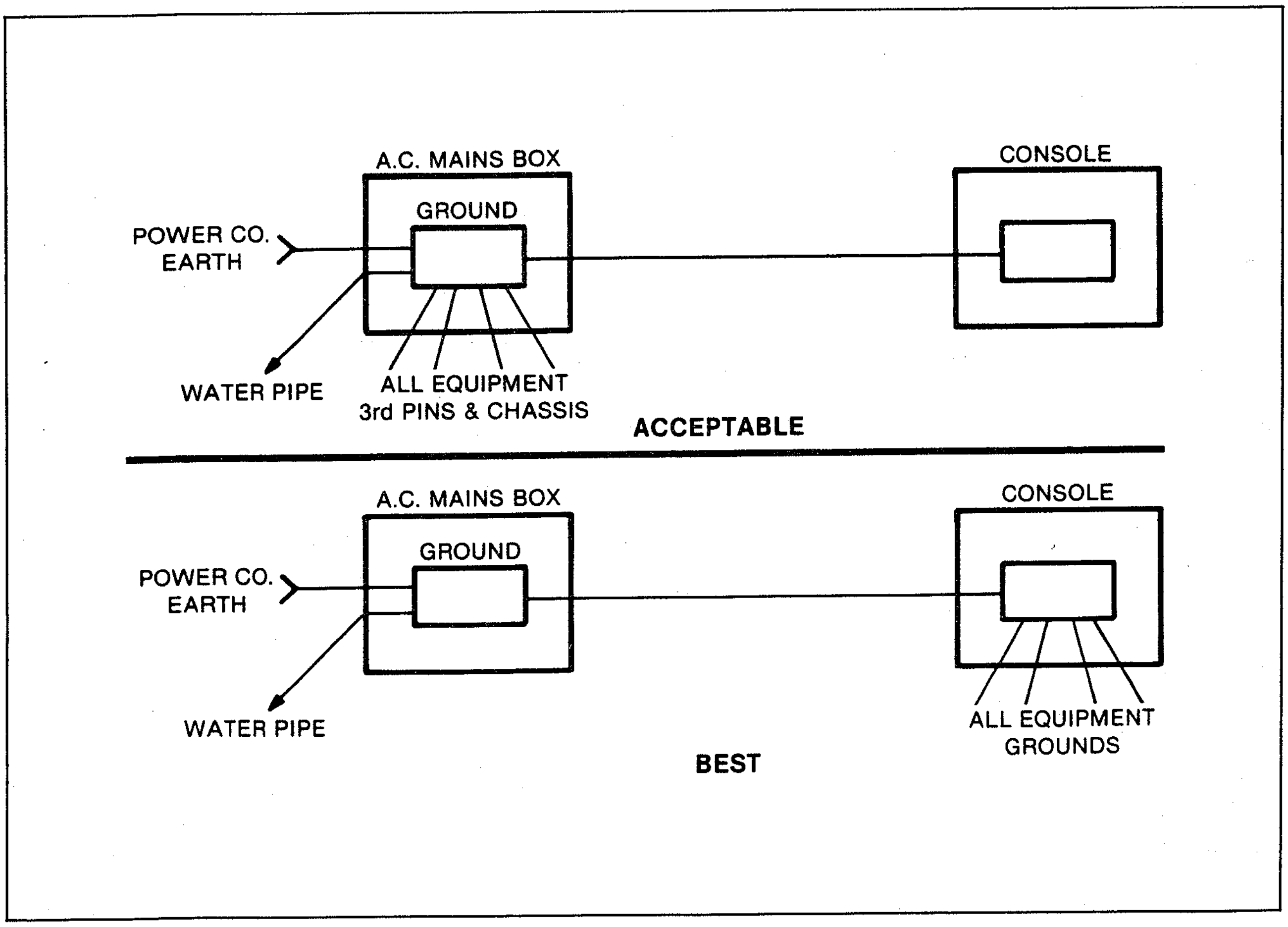


Figure 3. System Ground

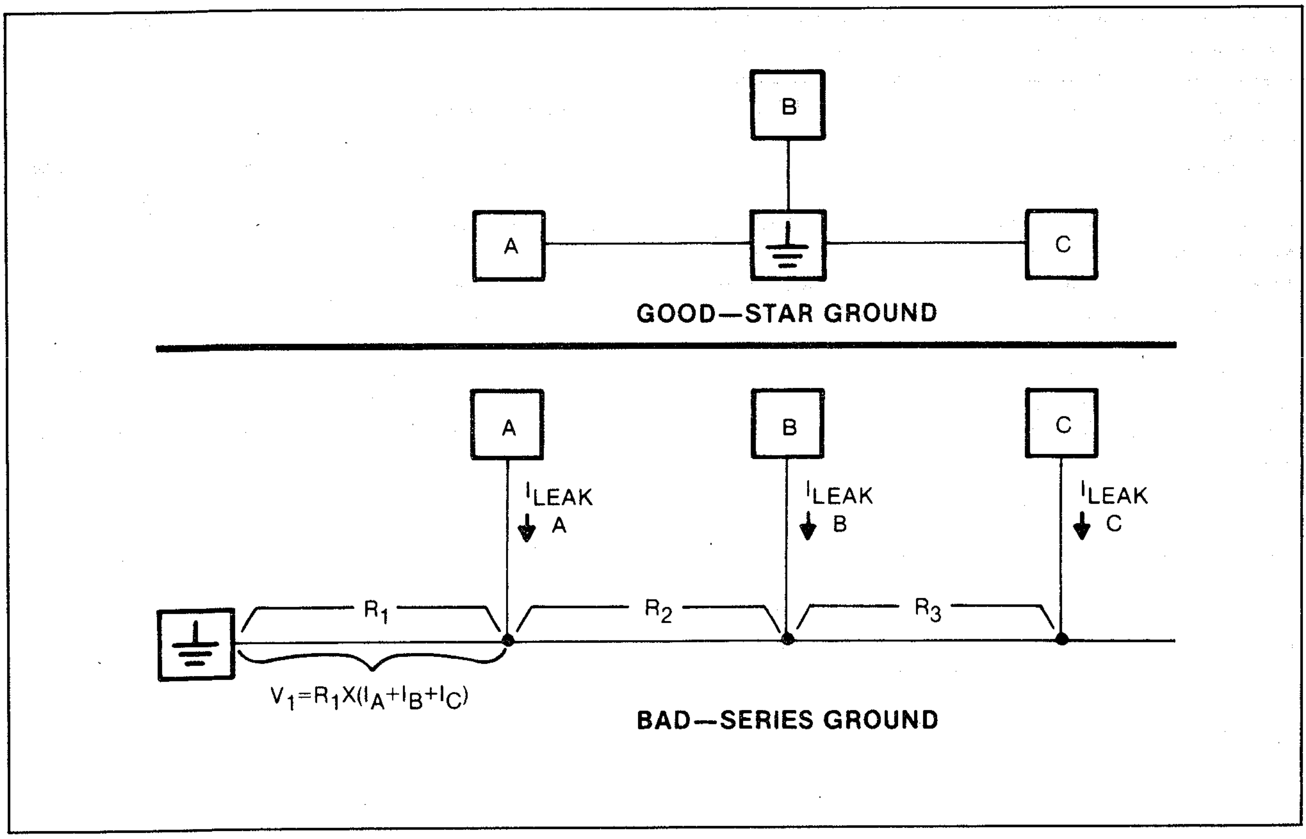


Figure 4. Star and Series Grounds

work. In most electrical installations, conduits are allowed to touch each other, touch water pipes and generally interconnect in random fashion, and these connections can introduce ground loops into an otherwise clean system.

All third pin grounds should be star-connected so that each outlet has its own wire back to the ground plate. In an ideal ground system, no piece of equipment is allowed to share a ground reference wire with any other piece of equipment. Series grounding inevitably leads to ground loop noise. (See Figure 4.)

During initial installation of the studio wiring, it is good practice to leave all third pin wires disconnected at the ground plate end. Then, after all wiring is run, each individual third pin can be checked for continuity or low resistance to the conduit before being connected. In this manner, shorts or partial shorts to conduit will be shown up individually before they are wired into the system.

Equipment Rack Grounding

Acceptable performance can usually be achieved if a single, heavy conductor wire is connected to ground from each power receptacle in the equipment rack. However, the following observations should be noted. Each piece of equipment installed in the rack must be properly designed with regard to grounding and shielding. A properly designed piece of equipment has its case, third pin, and electronics ground tied together at one, and only one, point. This becomes the zero potential point from which all current flows to the circuits. (See Figure 5.) Any piece of equipment which does not meet this criteria should be modified or electrically isolated before it is installed in the rack.

Any piece of equipment which does not have balanced inputs and outputs should be isolated from the rack and have a separate connection back to the ground point. (A properly connected third pin is usually adequate.) Failure to meet this requirement can cause AC leakage currents from all of the equipment in the rack to be superimposed on the audio low side, leading to excessive hum.

Only transformer-isolated equipment should be mounted in the rack, and any piece of equipment with an unbalanced power input line must be isolated by means of an external transformer. As shown in Figure 6, a power/ground loop results when the low side of

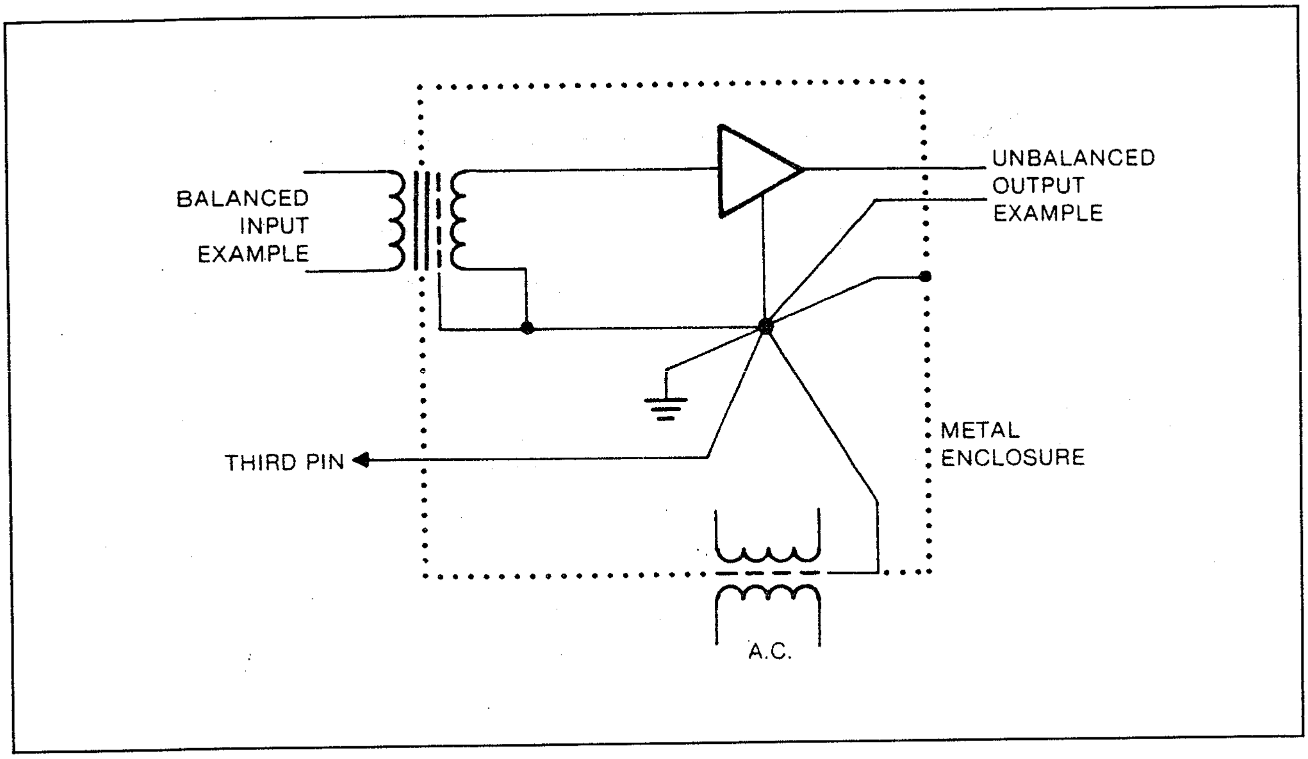

BALANCED
INPUT
EXAMPLE
UNBALANCED
OUTPUT
EXAMPLE
THIRD PIN
METAL
ENCLOSURE
A.C.

Figure 5. Equipment Grounding

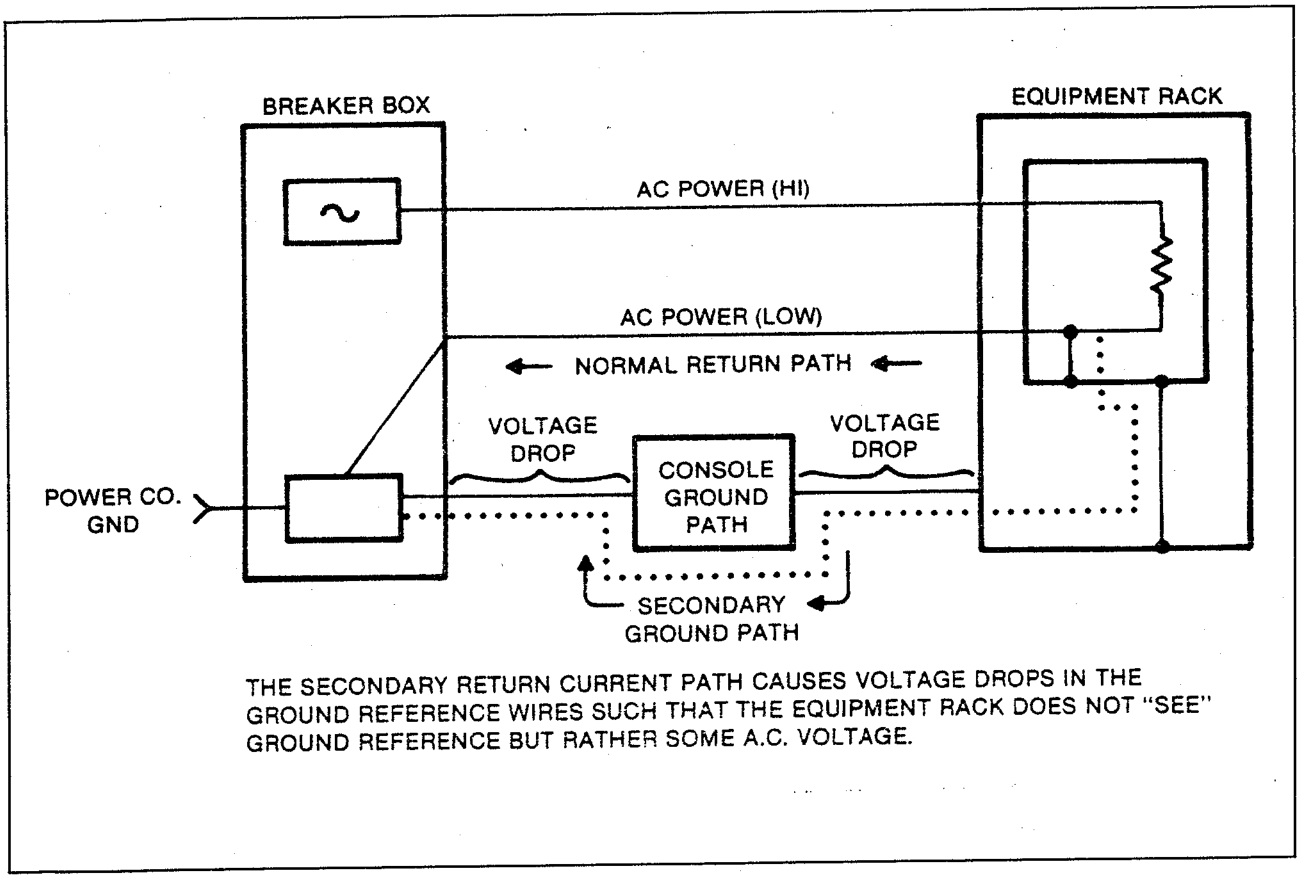
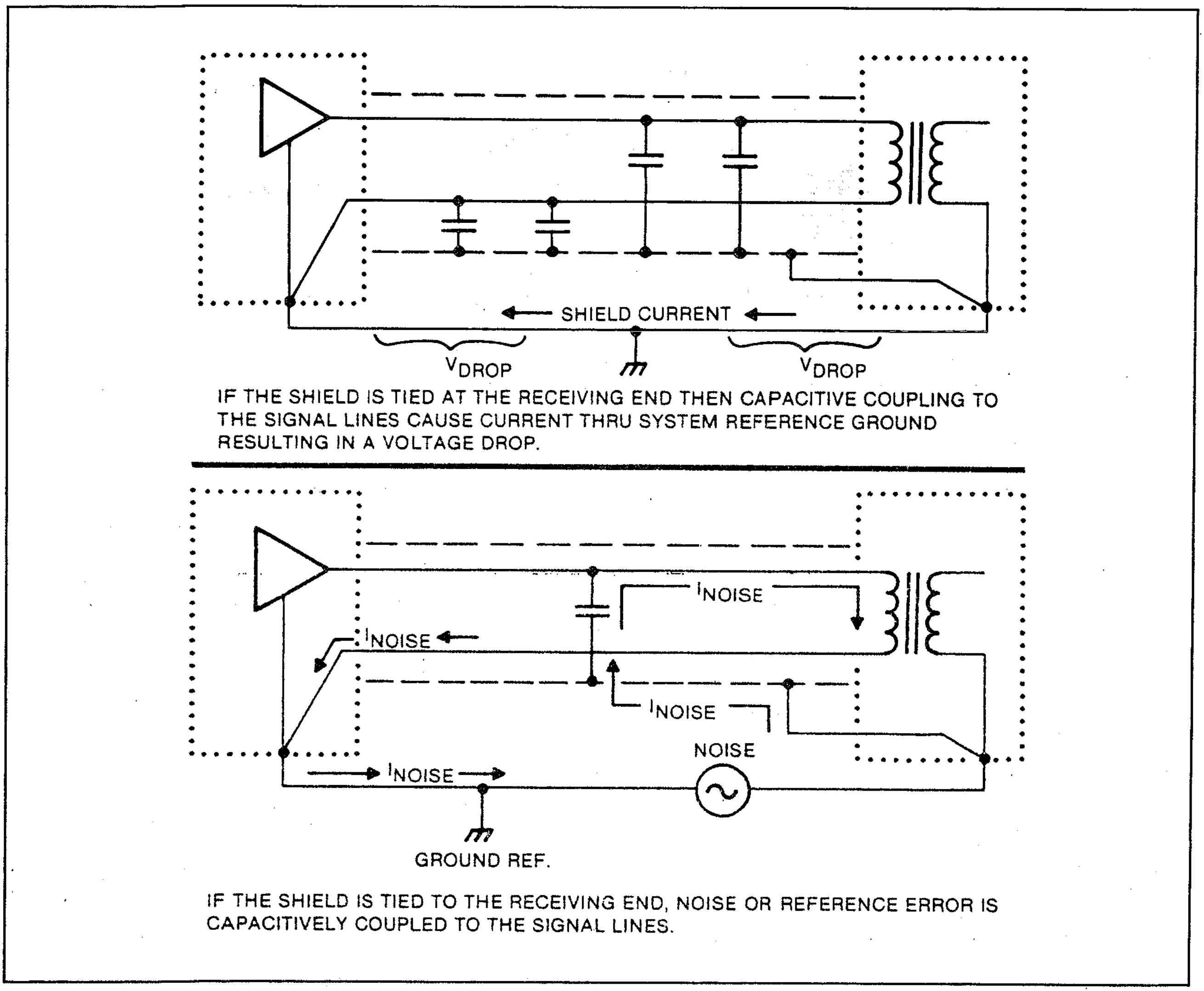

BREAKER BOX
EQUIPMENT RACK
AC POWER (HI)
AC POWER (LOW)
NORMAL RETURN PATH
VOLTAGE
DROP
VOLTAGE
DROP
CONSOLE
GROUND
PATH
POWER CO.
GND
SECONDARY
GROUND PATH
THE SECONDARY RETURN CURRENT PATH CAUSES VOLTAGE DROPS IN THE GROUND REFERENCE WIRES SUCH THAT THE EQUIPMENT RACK DOES NOT "SEE" GROUND REFERENCE BUT RATHER SOME A.C. VOLTAGE.

Figure 6. Unbalanced Power Input



IF THE SHIELD IS TIED AT THE RECEIVING END THEN CAPACITIVE COUPLING TO THE SIGNAL LINES CAUSE CURRENT THRU SYSTEM REFERENCE GROUND RESULTING IN A VOLTAGE DROP.

IF THE SHIELD IS TIED TO THE RECEIVING END, NOISE OR REFERENCE ERROR IS CAPACITIVELY COUPLED TO THE SIGNAL LINES.

Figure 7. Shield Current Paths

the AC line is tied to chassis. Further, if the equipment also has unbalanced inputs and outputs, the low side of the line can be linked back through the entire audio signal system. The low side of the AC line has current from each device flowing through it, and there is usually a potential difference of a volt or more between ground and the low side of the AC line. As a result, AC power can be fed through the console circuits to ground, modulating the ground line at 50/60 Hz.

Carry In Equipment

Very frequently, recording groups bring in their own electronic devices, wanting to connect them into the system. Since many of these devices are unbalanced and are not transformer-isolated, the balancing transformers in the console patch bay must be used to isolate them from the in-house equipment. If the control room circuits are properly wired, isolating the device inputs and outputs usually solves most of the hum and rf problems.

AUDIO CONNECTIONS AND SHIELDING

Once all of the studio equipment is properly connected to power and the ground reference, the signal lines can be connected. The general procedure given below allows the installer to pinpoint problems as they occur rather than having to search for them in a completed system.

1. Connect the monitor system to the console, and apply system power with Automation off and all of the channel faders closed. Set the master fader and all monitor faders to full level, and check the 2-Mix bus for hum, buzz or rf. If any undue noise is observed, recheck all of the power and ground

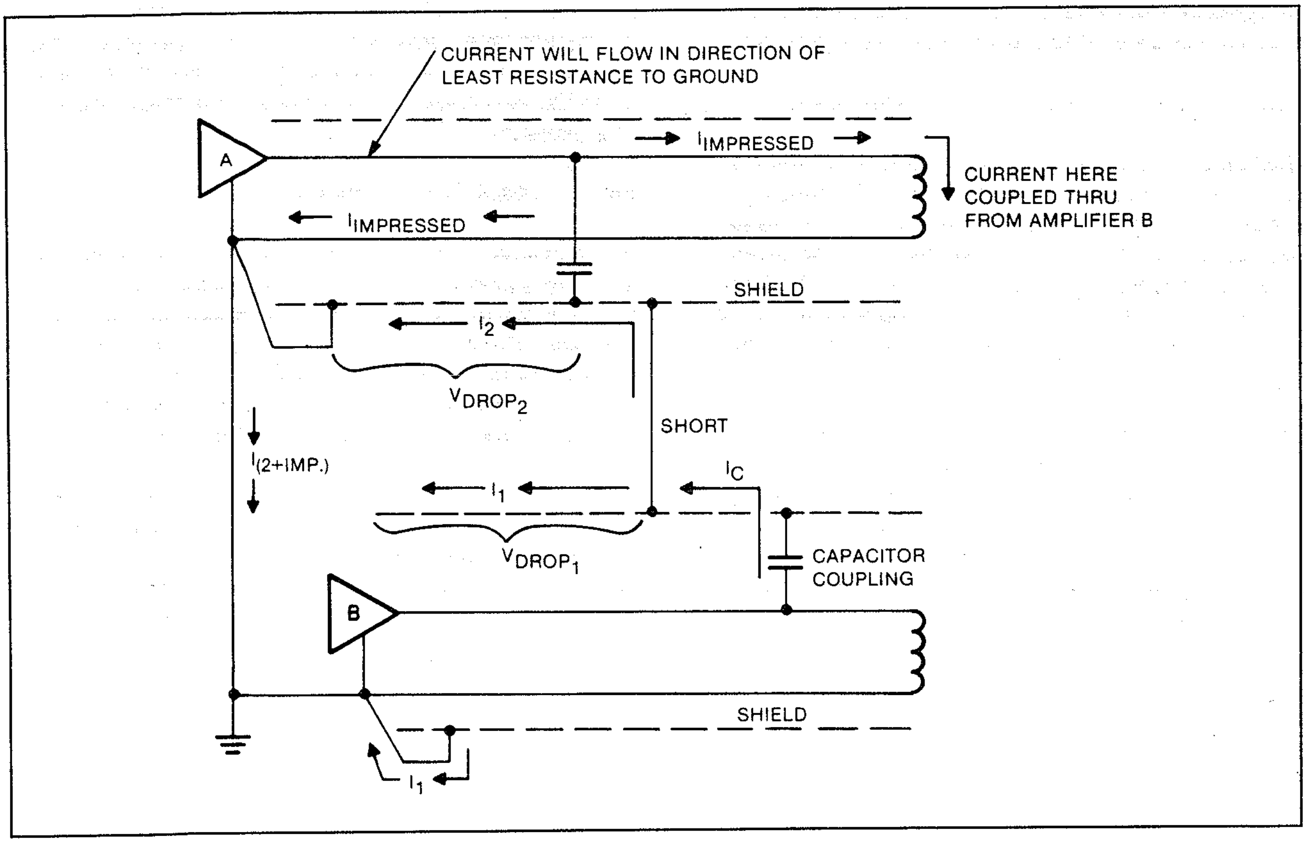

CURRENT WILL FLOW IN DIRECTION OF LEAST RESISTANCE TO GROUND
A
I IMPRESSED
I IMPRESSED
CURRENT HERE COUPLED THRU FROM AMPLIFIER B
SHIELD
I2
V DROP2
SHORT
I(2+IMP.)
I1
IC
V DROP1
CAPACITOR COUPLING
B
SHIELD
I1

Figure 8. Shorted Shields

wiring. When the system noise characteristics are acceptable, proceed to the next step.

2. Connect noise reduction units and multitracks to the console, one at a time. With the appropriate channel faders set to nominal levels and machines in input mode, check for hum buzz or rf as each piece is connected. In this manner, problems with individual equipments can be dealt with as they arise.
3. Connect all other peripheral equipments to the console, one piece at a time, in a manner similar to that described above.

General Audio Wiring Considerations.

The following paragraphs present some general guidelines which should be observed when connecting audio cables and shields. Adherence to these guidelines can eliminate most of the hum, buzz, rf and crosstalk problems usually encountered when wiring a new studio.

- Shields should be connected to signal ground only at the earth tie point on the signal source end of the cable.

This factor is important because of the critical shield current paths which have to be considered. The shield has three current sources, these being: capacitive coupling between shield and inner conductor, induction into the shield from surrounding electrostatic fields, and the shield's ground tie point. (See Figure 7.)

Any signal carried on the inner conductor is capacitively coupled to the shield, causing shield current to flow. This current must ultimately return through the shield to the signal source. With the shield connected at the source end, the current returns through direct connection to the source ground point, but, if the shield is tied to the receiving end, the current has to be returned through the entire ground system. Since the capacitive coupling impedance becomes less as frequency increases, an incorrectly grounded shield causes excessive high-frequency crosstalk by generating a voltage drop in the ground system.

Currents induced in the shield from nearby fields also need to be returned to earth by the shortest route and fewest signal grounds. These currents cause a voltage drop which appears at the outputs of all of the electronics referenced to the signal ground. It should be noted that the shield must be at the zero potential of the signal on the inner conductor, or the shield itself becomes a source of radiation into the signal line.

- Every signal line must have its own shield.

Signal lines which are run within a common shield are capacitively coupled to each other. If shields are shorted together anywhere other than at the signal reference point, then they share coupled signals and are not true shields to the inner conductors. The finite resistance of each shield causes a voltage drop which raises the shield above the signal's zero reference. (See Figure 8.)

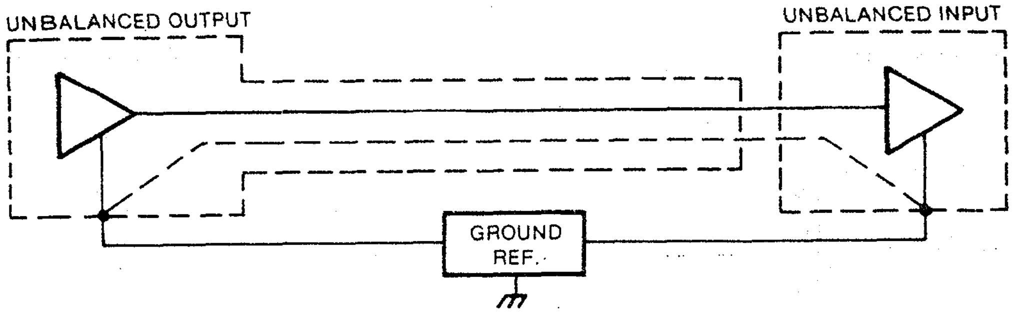
- In areas subject to rf fields, the receiving end of a shielded wire should be tied to signal earth/ground through a 0.01 microfarad capacitor.

At radio frequencies, the impedance of the recommended capacitor is low and reduces the effective impedance between shield and ground. A 24-track recorder connected in this manner has 0.5 microfarads of capacitance between the two systems. This represents about an impedance of about 5300 ohms at 60 Hz, and does not present a significant ground loop problem.

Input/Output Connections

In conclusion, the different pieces of equipment used in the studio have three possible input/output circuit configurations; unbalanced, balanced and differential. These have nine possible interconnection methods, each of which is shown in Figures 9 through 17. The particular considerations for each interconnect are noted on the applicable illustration.

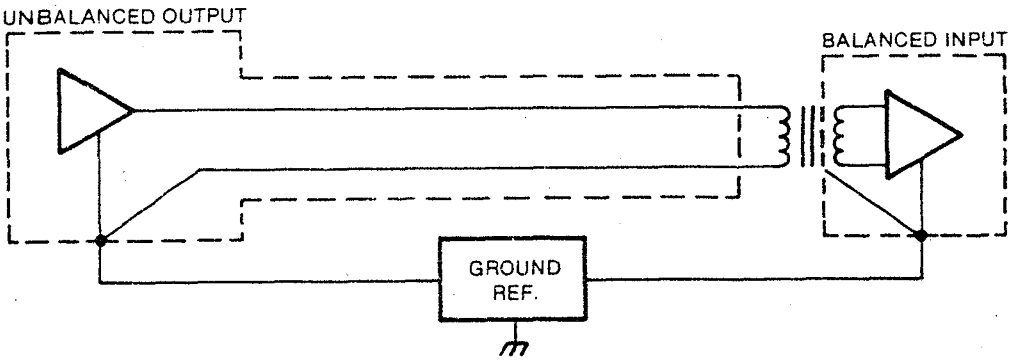
Great care should be taken when reviewing each interconnect drawing. The ground points indicated must be connected as shown, and, when several inputs or outputs are connected from the same unit, only one ground reference should be used for that unit.


UNBALANCED OUTPUT
UNBALANCED INPUT
GROUND REF.

TO AVOID GROUND LOOP PROBLEMS, BE SURE THAT THE A.C. IS TRANSFORMER-COUPLED AND THAT A GOOD GROUND REFERENCE CONNECTION IS MADE.

AVOID SHARING GROUND REFERENCE WIRE WITH OTHER EQUIPMENT.

Figure 9. Unbalanced Output to Unbalanced Input


UNBALANCED OUTPUT
BALANCED INPUT
GROUND REF.

FARADAY SHIELD ON THE TRANSFORMER IS IMPORTANT AS THE PRIMARY WINDING HAS ONE END AT GROUND AND WILL COUPLE TO THE SECONDARY AND INJECT HUM AND NOISE IF NOT ISOLATED.

Figure 10. Unbalanced Output to Balanced Input

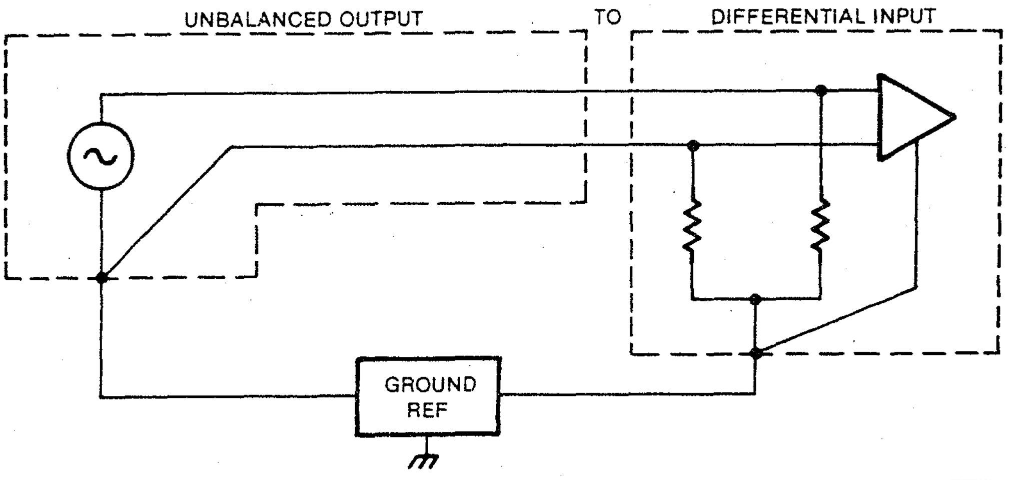

UNBALANCED OUTPUT
TO
DIFFERENTIAL INPUT
GROUND REF

Figure 11. Unbalanced Output to Differential Input

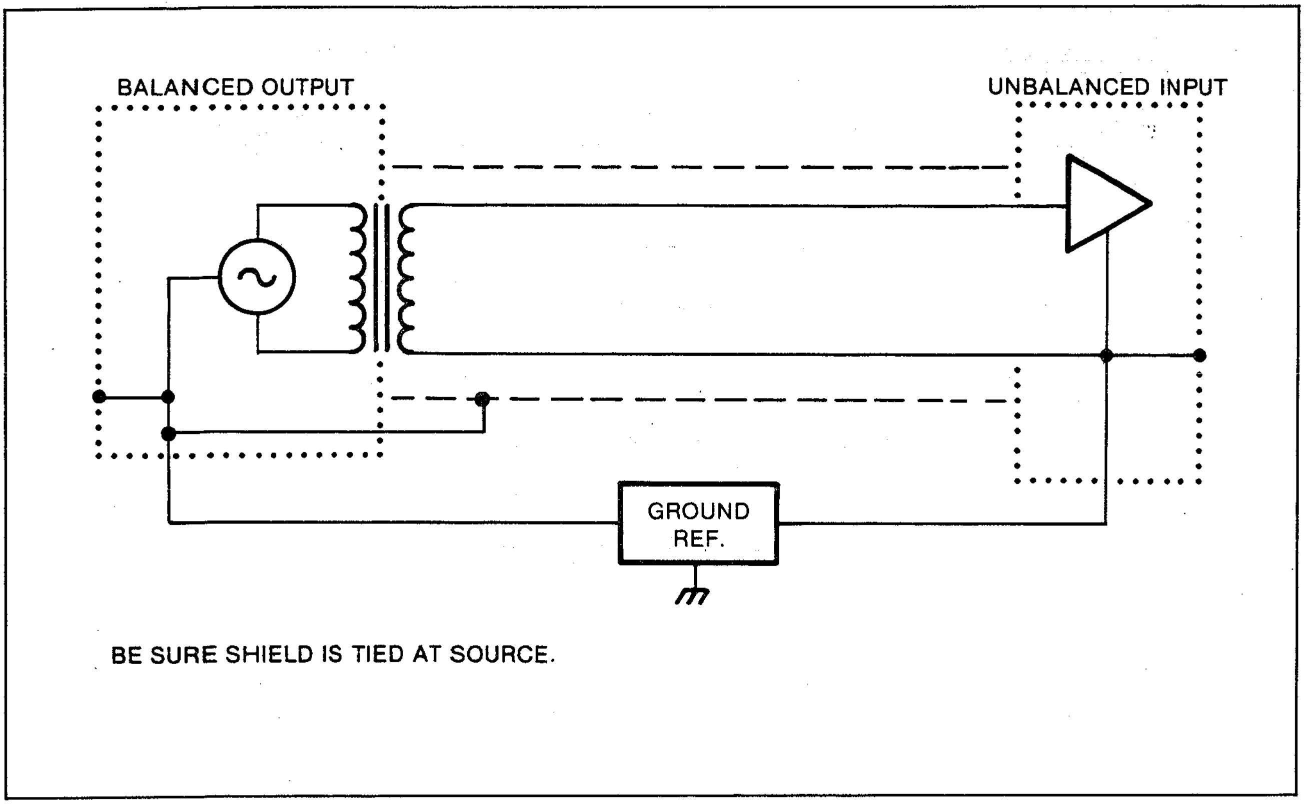

BALANCED OUTPUT
UNBALANCED INPUT
GROUND REF.
BE SURE SHIELD IS TIED AT SOURCE.

Figure 12. Balanced Output to Unbalanced Input

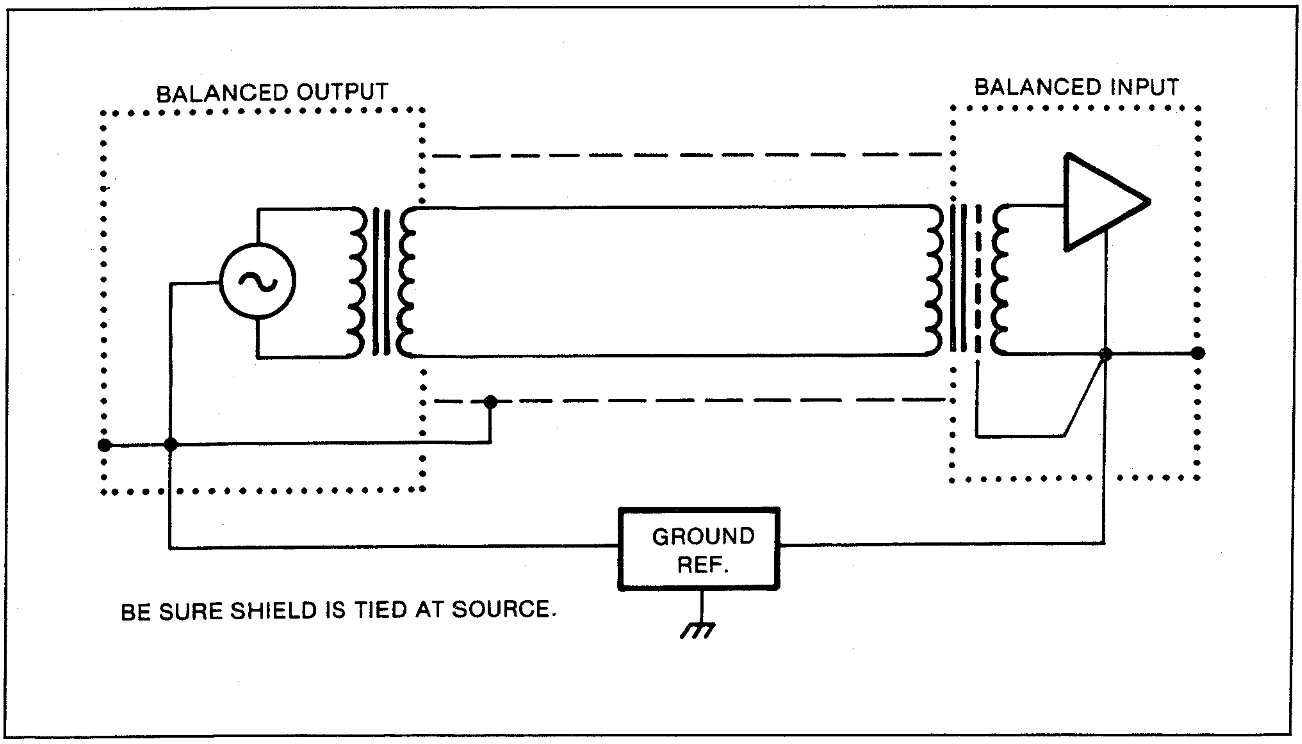
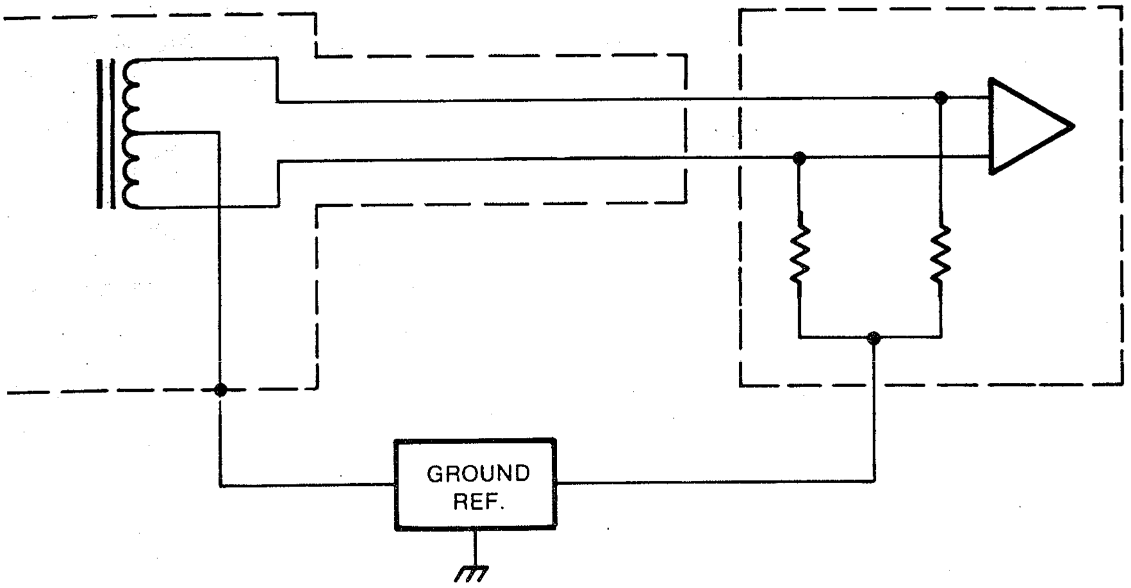
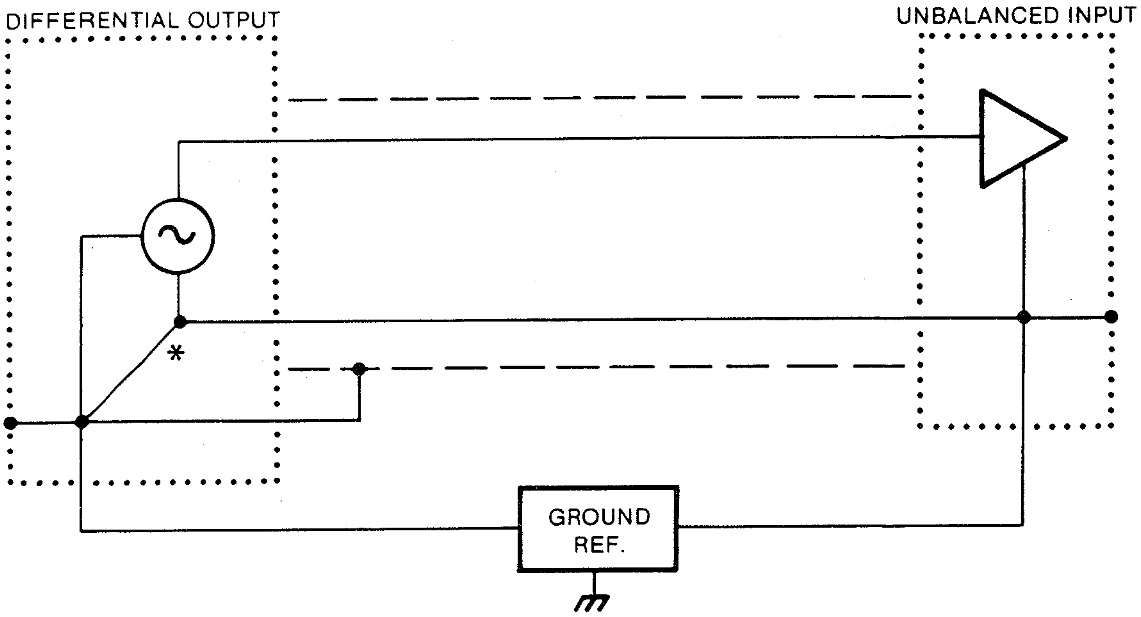

BALANCED OUTPUT
BALANCED INPUT
GROUND REF.
BE SURE SHIELD IS TIED AT SOURCE.

Figure 13. Balanced Output to Balanced Input



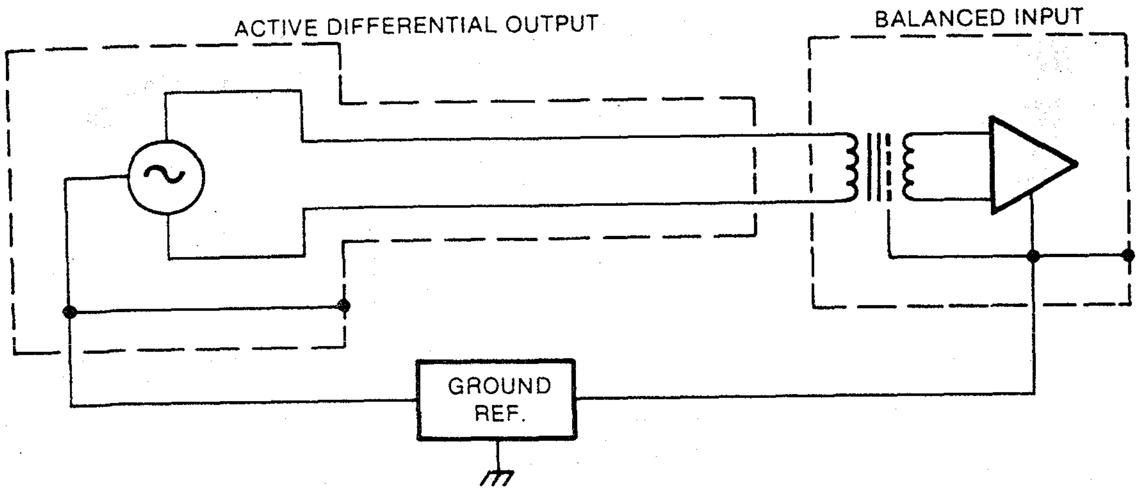
NOTE: OUTPUT TRANSFORMER IS FLOATING SO LINES ARE REFERENCED TO DIFFERENTIAL INPUT — TIE SHIELD TO DIFFERENTIAL INPUT GROUND.

Figure 14. Balanced Output to Differential Input


DIFFERENTIAL OUTPUT
UNBALANCED INPUT
*
GROUND
REF.

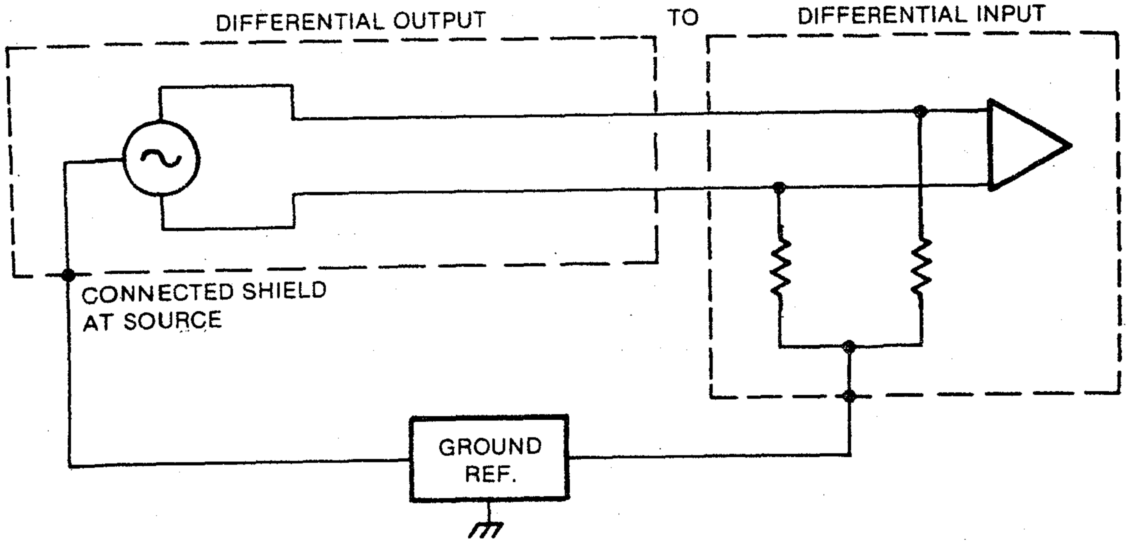
1. NOTE *GROUND — THIS IS IMPORTANT TO ACTIVE DIFFERENTIAL OUTPUTS. WHEN ONE OUTPUT SIDE IS SHORTED THE OUTPUT CURRENT NEEDS TO RETURN TO GROUND VIA THE SHORTEST, LEAST INDUCTIVE/CAPACITIVE ROUTE.
2. THIS IS NOT A DESIRABLE INTERCONNECT — WATCH FOR GROUND LOOPS AND OSCILLATIONS OF DIFFERENTIAL OUTPUT.

Figure 15. Differential Output to Unbalanced Input


ACTIVE DIFFERENTIAL OUTPUT
BALANCED INPUT
GROUND REF.

FOR BEST PERFORMANCE CHECK 20 KHz IMPEDANCE FROM EACH TRANSFORMER INPUT LEAD TO CHASSIS. POOR TRANSFORMER DESIGN RESULTING IN UNEQUAL IMPEDANCES TO GROUND WILL UNBALANCE THE DIFFERENTIAL OUTPUT AT HIGH FREQUENCIES WHICH MAY DETERIORATE PERFORMANCE BY REDUCING EFFECTIVE HEADROOM.

Figure 16. Differential Output to Balanced Input


DIFFERENTIAL OUTPUT
TO
DIFFERENTIAL INPUT
CONNECTED SHIELD AT SOURCE
GROUND REF.

THIS IS THE BEST METHOD OF INTERCONNECT USING TODAY'S TECHNOLOGY.

Figure 17. Differential Output to Differential Input